REGIONAL QUARTERS RENTAL SURVEY

COVERING
GOVERNMENT-FURNISHED QUARTERS
LOCATED IN

HAWAII SURVEY REGION

(HAWAII SURVEY DATE: FEBRUARY 2002)
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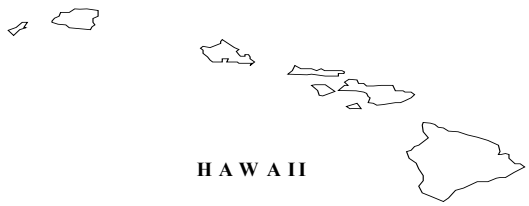

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I. SURVEY BACKGROUND

The Quarters Management and Information Systems (QMIS) Office coordinated a contractor-conducted field survey of the private rental housing market in the state of Hawaii, from January 2002 through March 2002. This survey was undertaken as specified in the Office of Management and Budget (OMB) Circular No. A-45, and the U.S. Department of the Interior's Departmental Quarters Handbook. OMB Circular A-45 provides for reconfirmation of the market based rental rates at least once every five years, or sooner, if conditions warrant.

The collection and analysis of rental housing data were accomplished employing methods similar to those used in previous surveys. Automated and manual analytical procedures were used to establish base rental rates for houses (including plexes) and apartments. Rental rates for cabins were established based upon their comparability with 1-bedroom houses. Rental rates for dormitories, bunkhouses and transient quarters were established by extending the principle of comparability, as provided for in OMB Circular A-45.

The objective of regional surveys, as set forth in OMB Circular No. A-45, is to develop reasonable rental rates based upon the ". . . typical rental rates for comparable private housing in the general area in which the Government quarters are located . . .." The policy set forth in OMB Circular A-45 is as follows:

> Rental rates and charges for Government quarters and related facilities will be based upon their "reasonable value...to the employee...in the circumstances under which the quarters and facilities are provided, occupied, or made available."...reasonable value to the employee or other occupant is determined by the rule of equivalence; namely, that charges for rent and related facilities should be set at levels equal to those prevailing for comparable private housing located in the same area, when practicable...

The regional survey method uses regression analysis techniques to establish a base rental rate for a given type of quarters that reflects the typical rate for that type of housing in the survey area. Regression analysis allows the QMIS Program Office to establish adjustments that reflect: (1) the contributory value (+ or -) of housing features that the private rental market indicates are significant; and (2) relevant social and economic factors that are manifested in the rent levels of individual communities.

Because regression analysis permits assessment of (and adjustment for) different locations, as measured by market rents, several localities or states can be surveyed at a time to minimize data collection costs and the rates can be individualized for communities significantly at variance with the regional rent pattern.

The resulting product (finalized rental rates), when derived from carefully applied automated statistical analysis, provides a logical and equitable base rental rate structure supported by the market rental rate pattern of the region and the community.

II. INVENTORY OF GOVERNMENT-FURNISHED QUARTERS

This survey was initiated with an inventory of Government-furnished quarters (GFQ) managed by the agencies and bureaus that participate in the QMIS program.

All agencies and bureaus are now using the QMIS database software to manage their inventories. The QMIS Program Office in Denver developed this software. The database software allows an installation or region to maintain its own housing inventory. Rents can be calculated in just minutes, even for hundreds of quarters. This decentralized system provides local control of the housing inventory. As always, the key to accurate rents is accurate, up-to-date inventory information. Software with the new housing rental rate formulas and new utility rates is distributed from Denver whenever new regional surveys are conducted or at CPI time. If you do not receive new CPI software by approximately January 1st of each year, please contact the QMIS Program Office (303-969-7240). It is important that all agencies and bureaus submit (on diskettes or via electronic mail) updates to their housing inventories at least once a year. This information is used to determine the communities and characteristics to be sampled in new Regional Surveys. The information is also used for various general management reports.

III. CONTRACTING FOR THE PRIVATE RENTAL SURVEY

A. DETERMINATION OF THE COMMUNITIES TO BE SURVEYED

Selection of the communities to be surveyed was initiated with a review of the nearest established communities identified in the quarters inventory process. Their geographic locations and populations were determined to enable selection of established communities nearest to concentrations of Government housing.

Inclusion of these communities enables a comparison of the community rental rate structure with that of the survey region. This permits a ready determination of whether the local or the regional rental rate structure should be utilized to establish the GFQ base rents. A complete discussion of this process is contained in section IV of this report.

The communities surveyed represented broad geographic and population ranges. The largest community surveyed, Honolulu, HI had a 2000 population of 371,657. The smallest community, Kualapuu, HI, had a population of 1,936. A list of the surveyed communities appears as Table 1. In accordance with OMB Circular A-45, communities with 2000 census populations below 1,500 were not analyzed.

TABLE 1 COMMUNITIES SURVEYED

STATE AND COMMUNITY	2000 CENSUS POPULATION
HAWAII	
Hilo, HI	40,759
Honolulu, HI	371,657
Kapaa, HI	9,472
Kualapuu, HI	1,936
Pukalani, HI	7,380

B. DETERMINATION OF THE HOUSING CLASSES TO BE SURVEYED

In order to determine which housing classes to survey, the inventory data for the agencies participating in the QMIS system were separated into housing classes shown in Table 2, below. Analysis of the data revealed the following numbers of units per housing class:

TABLE 2 GOVERNMENT-FURNISHED QUARTERS - (BY HOUSING CLASS)

Housing Class	# of Units	Avg Age	Age Range	Avg. SQFT	SQFT Range
Houses					
3 Bedrooms	22	58	(6 – 77)	1,940	(960 – 2,210)
2 Bedrooms	13	61	(40 – 77)	1,303	(665 – 2,058)
1 Bedroom	12	69	(62 – 77)	512	(311 – 828)
Apartments					
3+ Bedrooms	1	61	61	2,312	2,312
2 Bedrooms	6	8	8	651	(648 – 666)
Dormitories	5	38	(11 – 45)	388	(245 – 960)
TOTAL UNITS	59				

As with other regional surveys, the contractor was directed to survey only those housing classes for which a representative sample could be readily obtained in the private rental market. Thus, comparables were not obtained for cabins or lookouts, temporary housing, travel trailers, bunkhouses/dormitories, transient quarters or tents.

Rental rates for cabins were established by using the average rental rate for one-bedroom, single-family houses as the basis of comparison. Additional adjustments, that reflect the absence of certain standard housing features in some cabins, have been included for use when appropriate.

Since temporary housing and travel trailers (mobile home-like structures containing less than 256 square feet of gross living area) are most structurally similar to mobile homes, the rental charges for these housing classes are based upon the analysis of mobile home market rental comparables.

Since comparable bunkhouse or dormitory housing does not exist in most communities, the QMIS Program Office is unable to obtain sufficient market data to provide a satisfactory statistical base. Consequently, rental rates for bunkhouses and dormitories have been established using an extension of the Principle of Comparability, as permitted in OMB Circular A-45. Similarly, the rental charge for transient quarters has been established in conjunction with the dormitory rate structure.

OMB Circular A-45, revised October 20, 1993, excludes tents from the definition of Government-furnished quarters. Therefore, rental charges have not been established (and should not be assessed) for tents which are used as employee housing.

Two housing classes (houses/plexes, and apartments) were ultimately selected for field survey and computer analysis. The contractor was instructed to select comparables, built to Housing and Urban Development (HUD) minimum housing standards, wherever possible. The number of observations obtained for each housing class in each community surveyed varied depending upon the number of nearby Government quarters of that class. The inventory data for each of the housing classes was analyzed to determine frequencies and age and size ranges for major construction elements. The information in Table 2 was used to guide the contractor in the conduct of the survey.

C. HEATING FUELS AND UTILITY CHARGE SURVEY

To ensure reliability of the energy consumption estimates for housing where consumption is neither metered nor measured, this report uses a series of contractor-developed heating and cooling consumption tables for each general type of housing represented in the survey. The tables are based upon energy consumption studies that use a methodology meeting housing industry standards. The results reflect energy consumption for variously sized single-family houses (with and without basements) and apartments. A complete discussion of the energy consumption/cost methodology is contained in Section VI.

D. CONTRACTOR SELECTION

The National Business Center, Products & Services provided procurement support and project coordination for this Private Rental Survey. Reimbursement for survey expenses was underwritten by the agencies and bureaus that participate in the Quarters Management Program.

The private rental survey was completed by Delta-21 Resources, Inc. of Oak Ridge, Tennessee, during the months of January 2002 through March 2002. A total of 300 private rental housing comparables were sampled. In addition, electrical, heating fuel, utility, appliance, and other related service charges were collected in each of the communities surveyed. The private rental housing costs that were obtained reflected current rental costs and required no adjustment for time.

IV. REGIONAL SURVEY PRINCIPLES AND PROCEDURES

A. SURVEY PRINCIPLES

The purpose of a regional survey is to determine and establish reasonable quarters rents, through an analysis of the market rents of comparable private housing in established communities nearest to concentrations of Government housing. The process of arriving at the base rent of a structure is influenced by real estate appraisal principles, statistical limitations, and administrative considerations. Often there may be a conflict among these three interests, which necessitates a trade-off.

1. Real estate appraisal principles include matching comparables as closely as possible to the specific subject properties in physical characteristics and location, and adjusting in a logical direction for all significant differences.

2. Statistical principles involve: (a) trying to minimize the standard error of the estimate (unexplained variation); (b) getting a good match of characteristics between the properties analyzed and those the analysis is applied to; (c) obtaining a large and diverse sample; and (d) making adjustments for factors that are significant in explaining variation. Ideal samples may not always be available in the market; and the market search may be limited (like an appraisal) because of time and budget constraints.

3. Administrative considerations recognize that Government housing is usually not located in established communities, and that physical characteristics (such as in historical houses, one-room cabins, lookouts or dormitories) are difficult to match in the market. Government quarters are often found in areas influenced by tourism or boom/bust natural resource development that may produce unreasonable rents. Consistency and relative reasonableness, as well as time and budget constraints must also be taken into consideration.

4. While trade-offs among these three considerations may result in a less than ideal application of any one of the three principles, the goal is still to produce "reasonable" Monthly Base Rental Rates (MBRR) for quarters that are relatively consistent with the local market rents for similar housing, internally consistent and logical from one unit to another, and represent reasonable value to the employee.

B. MULTIPLE REGRESSION PROCEDURES USED IN RENTAL RATE COMPUTATIONS

There are several reasons for using the regional survey method to arrive at quarters rental rates. These include accuracy, consistency, fairness, cost effectiveness/economy, and the provision in OMB Circular A-45, that regional surveys are the preferred method.

Prior to the use of the regional survey method, quarters Monthly Base Rental Rates (MBRR's) were reset every five years by individually appraising each quarters unit. The appraisal process normally relied upon the use of a small number (2-4) of comparables for each subject Government quarters unit and made logical or market abstracted adjustments to each comparable. In many instances the same comparables were used to establish rental rates for several quarters. Thus the selection of comparables became critical. Individualized appraisals often led to inconsistencies among units in the same area. Many times different agencies, managing similar or identical housing units in the same area, had substantially different rents after analyzing the same rental market. Appraisers valuing several different units using separate sets of comparables and adjustments can also sometimes arrive at rents not logically related to one another. Finally, the appraisal process required a considerable amount of travel, and individualized writing, typing and editing of appraisal reports, which was expensive and very time consuming.

Alternatively, the regional survey method relies upon much larger samples of comparables. These are analyzed, statistically, to objectively determine those factors that are significant in explaining variations in the adjusted rent of each class of comparables. Each class of comparables (houses and apartments) is analyzed separately to determine which locations and physical characteristics are important in explaining the differences in rents among individual rental units and communities. The computer program independently and objectively determines the best set of characteristics (formula) to explain the rental pattern. This formula varies for each survey region and housing class.

The rental rates are based upon an analysis of regional data and local data. The rents in all surveyed communities for each housing class are tested for statistical significance. All significant negative location adjustments are applied to the quarters using that community as their nearest established community. **Positive location (community) adjustments are not applied; so Government housing units near high-rent communities are charged the typical rent for the region as a whole, rather than the typical rent for that high cost location.**

The statistical process used is called forward in-and-out, step-wise multiple regression analysis. It takes all of the variables considered and forms a matrix or grid showing how every variable is related to every other variable (cross-correlation matrix). In this phase of the analysis, significant inventory items relating to the dwelling structure are coded into the computer as variables to be tested for their impact, if any, on rent. The variable to be explained (in this case rent) is called the dependent variable, because its value is determined by that of the other (independent) variables.

In forward in-and-out step-wise multiple regression analysis, the independent variable that explains the most variation in the dependent variable (rent) is selected first by the computer and entered as Step 1. The remaining variation is then recomputed, and the independent variable that explains the largest portion of the remaining variation is selected by the computer and entered as Step 2. As each new variable is added, the coefficients of all the previously entered variables are recomputed to take into account relationships among

the independent variables. If a previously entered variable no longer meets the test of significance, it is removed.

As this procedure uses the variation squared, it is highly sensitive to cases with extreme variations from the norm. Since the purpose of a regional survey is to find the typical rent for housing with certain characteristics, it is useful (and mandatory) to cull comparables with unusually high or low rents that are apparently unrelated to their characteristics. Such non-conforming rentals tend to obscure the typical pattern. To accomplish this culling, the following steps are normally taken.

Step 1. A listing of all the comparables is checked to see that the program has proper decodes, that no rental has been entered twice, and that the data is complete for each variable to be tested. The range for each rent class is also checked.

Step 2. Regression Run 1 (square foot base formula): The purified data base is analyzed for the best fit of adjusted rent versus square feet and the logarithm of square feet. This comparison is undertaken because square footage in buildings is generally the variable that explains the most variation of adjusted rent. It is also a universal variable (one that applies to all cases) and a continuous variable (one that changes in many small increments).

Step 3. A listing is produced which shows by community the rent/predicted rent ratio of each private rental sample. The predicted rent is one computed using the square foot base formula derived in step 2. The purpose of this listing is to screen out individual rentals whose ratios are far out of line relative to other rental comparables in the same community.

Step 4. A scattergram of rentals for each class, showing adjusted rent by square feet, is produced to visually display the data. These scattergrams, and the listings produced in Step 3, above, are used to remove samples with unusually high or low rents in each size grouping. A separate variable for each of the remaining communities is then entered into the next step, the full regression analysis, to see if it has a statistically significant location adjustment after other adjustments have been made. This run and a crosstab run of physical features allows for selection of other variables that are significantly represented and widely (geographically) distributed. These variables are turned into dummy (yes/no) and combination variables. Continuous and discrete variables are entered as simple variables, logarithmic transformations, and in logical combinations.

Step 5. (First Full Regression Run). The screened samples for each housing class to be analyzed, along with the variables to be tested, are analyzed to find coefficients for the significant variables. The results are checked for logic and cross-correlation; normally only one form of a variable is allowed to stay in the equation. Variables with illogical results are checked to find reasons for such deviation from expected results. Such variables are normally dropped from subsequent regression runs. Sometimes the samples containing such variables are culled; however, that action (culling samples) is uncommon.

Step 6. (Other Full Regression Runs). The full regression analysis is rerun without the illogical variables and/or dropped cases. If the end results look reasonable, the coefficients determined by regression analysis are used to compute Monthly Base Rental Rates (MBRR's) for individual Government-furnished quarters.

Step 7. (Predicted Rent Tables). The coefficients of each satisfactory regression run are put into a computer program which produces a table of predicted quarters MBRR's. The base values and all possible combinations of adjustments are reviewed to ensure the results are reliable for the full range of values. If not, the cause of the problem is diagnosed and corrected, and the regression analysis is rerun, producing a revised set of coefficients. Then Step 6 is repeated, and a new set of rent tables is produced.

V. ESTABLISHMENT OF MONTHLY BASE RENTAL RATES (MBRR)

A. USE OF BASE RENT CHARTS

Although rental computations have been automated, producing Monthly Base Rental Rates (MBRR's) and final Net Rents for most quarters, housing managers should understand the methodology used in determining the rental rates. Therefore, a set of charts has been prepared to allow the manual computation of the MBRR's for each class of rental housing. The charts have been constructed as size/age tables for the two major categories of housing (houses and apartments). By knowing the gross square feet of the livable area (size), the age, and the housing class of a building being used as quarters, one can determine the base rent from the proper table. The charts also contain columns and/or footnotes of rent adjustments, which modify the rent from the size/age table to produce a MBRR for an individual quarters unit. **The value of one refrigerator and one stove is included in the rents listed in Tables 3a-d, 4a.** Therefore, if the Government does not provide a refrigerator or a range in the quarters, the value of each non-provided appliance should be subtracted from the monthly rent. The current values of a refrigerator and range are shown in Table 16 of this report, and may be adjusted annually by the QMIS Program Office to reflect changes in the Consumer Price Index (CPI) which may occur following the issuance of this report. In selecting the appropriate rent table, it is important to remember that the **design of the quarters, not its use, determines its category.** Thus, a house or an apartment unit **designed** to be occupied by an individual or a family, but which is actually used to house unrelated individuals, would be valued by the category for which it was designed to be used, rather than as a bunkhouse/dormitory. Where, however, a structure is not designed for occupancy by an individual, or family, or has been substantially modified to house individuals on a dormitory basis, it would be appropriate to apply bunkhouse/dormitory rates. Thus, an unmodified three-bedroom house with a **planned occupancy** of six unrelated individuals (normally two persons per bedroom) would have a rental rate determined by calculating the rental rate for a three-bedroom house and then dividing that rate by six. This rate would change if the number of **planned** occupants changed. If the house were later **structurally modified** to be used as a bunkhouse/dormitory, the rate then would be the dormitory rate.

Based upon information provided by the contractor, deductions from the monthly contract rental rate of each rental sample were made for the contributory costs of utilities, appliances, furnishings and services, provided and included in the contract rent. No deductions were made for central air conditioners, refrigerators or ranges; however, if a refrigerator or range was missing, the value was added to the adjusted rent. Central air conditioners are valued at their contributory value, if any. The resulting adjusted monthly contract rental rate represents the contributory value of the dwelling structure equipped with a refrigerator and a range.

The establishment of final monthly quarters rental charges for houses and apartments requires the addition of charges for Government-provided utilities, services, appliances and furnishings. Conversely, **deductions** are required for the values of ranges and refrigerators when they are not provided by the Government.

There are a total of five rental rate charts: four charts for single-family housing, and one chart for apartments. Instructions for computing rental rates for cabins, bunkhouses and dormitories, and transient quarters are found in Sections V.D, V.E, and V.F, respectively. Because OMB Circular A-45 excludes tents from the definition of "rental quarters," there is no charge for the provision of tents.

The use of the charts is fairly simple. First, find the chart for the category into which the GFQ fits. Next, round the square feet **down** to the nearest hundreds of square feet. Thus, if a unit has 980 square feet, the row labeled 900 SQFT would be used. Then the age should be rounded **up** to the nearest age increment. If the dwelling at issue was built in 1979, its age would be computed as 2002 (the current year) minus 1979 (the year built). Thus, in this instance, the unit is 2002 - 1979 = 23 years old; and the column headed by "25 YEARS OLD" should then be followed down to the 900 SQFT row to obtain the size/age adjusted rent.

The rent charts also have various location adjustments, as well as adjustments for physical features such as the number of bathrooms, the type of garage facilities, the condition of the housing, etc. These should be subtracted from, or added to, the size/age adjusted rent, as specified, to determine the MBRR.

When computing the final biweekly rent (net rent) to be paid, the MBRR must be adjusted to include the value of Government-provided related facilities (utilities, appliances, furnishings and services); and the administrative adjustments prescribed in OMB Circular A-45. Use Form DI 1880, Rent Computation Schedule, or similar form as may be used by agencies other than DOI.

Where a dwelling is larger than the highest square footage in the chart pertinent to that unit, use the size/age rent and adjustments of the bottom (largest SQFT) row. This may eliminate the need for some administrative adjustments due to excess size of the housing. If a dwelling is smaller than the smallest square footage, use the lowest square footage listed on the chart.

The rent for a dwelling with more than 4 bedrooms (3 bedrooms for apartments) is calculated as if the unit had 4 bedrooms (3 bedrooms for apartments). In addition, the carport charge is the same regardless of the size of the carport; the maximum garage charge is the amount for a 2-car garage; and the fireplace charge is the same for one or more fireplaces. For rental calculation purposes a "cap" of 3 bathrooms applies. Therefore, assume 3 bathrooms when applying the bathrooms charge in the rent charts shown in tables 3a-d, and 4a.

To assist in the calculation of quarters MBRR's, examples are provided in the following pages. While the rates appearing in the following tables should allow you to establish MBRR's for essentially all of your properties, we recognize that we might not have anticipated all situations and conditions. Therefore, housing managers should use professional discretion to set rates for truly unusual situations. In cases where you must use some other method to establish rates, please notify the National Business Center, Products & Services, Quarters Operations Office via telephone **303-969-7240** or fax 303-969-7173. You should explain the conditions, the rate used, and your reasoning so that we may anticipate such circumstances in the future. You should retain the documentation for such actions in your files.

B. SINGLE FAMILY HOUSING

For single family detached houses, including plexed dwellings and townhouses, use the rental chart which appropriately describes the housing class and the number of bedrooms of the subject quarters. The charts for houses are in tables 3a through 3d.

Assume for example, a 3-bedroom, 1 1/2-bath house, that was built in 1958 and which has a 1-car garage, and 1,276 gross square feet of living space. The house, located near Hilo, HI is fair in both exterior and interior condition.

First, the chart for 3-bedroom, good condition, 1 bathroom, houses (Table 3b) should be located and used. These charts are baseline charts, which assume that each house is in good condition inside and outside and has one full bathroom. Therefore, if the house is in good condition inside and outside and has one bathroom, no additional computations are needed. If there is a deviation from either good inside or outside condition or there are less or more bathrooms than one, then the computations must be changed as discussed below. In the first step, Table 3b is selected as the proper chart for 3-bedroom houses.

Next, the size (gross finished floor space) should be rounded **down** to the nearest 100 square feet (from 1,276 to 1,200 sqft). Under the column headed "**SQFT**," the figure 1,200 should be located. Further adjustments will be taken from this row.

Finally, the appropriate age column should be selected. The house in this example is 2002 - 1958 = 44 years old. The age should be rounded **up** to the next highest age column, which, in this case, is the column headed "**45 YRS OLD**." Follow this column down to the 1,200 square feet row to obtain the size/age "table rent" of $840.

The first adjustment is the extra bathroom charge. Follow the column headed "**PER EXTRA BATHROOM**" down to the 1,200 SQFT row to find a charge of $238 for a full extra bathroom. As the house in this example has only 1/2 of an extra bathroom, the adjustment is $238 x .5 (1/2 extra bathroom) = $119.00. Add $119.00 to the rent.

The second and third adjustments are made for a fair exterior and a fair interior condition. Follow the column headed "**FAIR EXTERIOR/INTERIOR***" down to the 1,200 SQFT row. The amount reflects a deduction of $17 for a house with a fair exterior **and** a deduction of $17 for a house with a fair interior. Since both the exterior and interior are in fair condition, the total adjustment is $-34.

The fourth adjustment is for a one-car garage. Follow the column headed "**GARAGE (PER CAR)**" down to the 1,200 SQFT row. $116 should be charged for each car the garage is designed to accommodate. Since the house in this example has a 1-car garage, multiply the amount shown for one car ($116) times 1 to reflect the value of a 1-car garage (1 x $116 = $116). Add $116 to the rent.

The final adjustment is the community adjustment. The house in this example is located near Hilo, HI. The notes beneath the table (see "**COMMUNITY ADJUSTMENTS**") reflect that Hilo, HI receives an adjustment of $-271. As instructed, subtract $271 from the rent. Community adjustments are given only to communities in which the market rents are **lower** than the regional average level of rents. Communities not

listed in the tables have rents, which are equal to or higher than the regional average rent and do not receive community adjustments.

The last step is rounding the resulting MBRR to the nearest whole dollar. If rounding is to be exercised, amounts equal to $.50 or more should be rounded **up** to the next highest dollar; amounts equal to $.49 or less should be rounded **down** to the next lowest dollar. The decision to round is discretionary.

In summary, the adjustments that produce the Monthly Base Rental Rate for the house used in this example are shown below.

Table Rent (1,200 SQFT/45 yrs. old)	$840.00
Extra Bath Adjustment (.5 X $238)	+ 119.00
Fair Exterior Condition Adjustment	- 17.00
Fair Interior Condition Adjustment	- 17.00
Garage Adjustment (Per Car X $116)	+ 116.00
Community Adjustment (Hilo,HI)	-271.00
Monthly Base Rent	$770.00
Monthly Base Rent (Rounded)	$770.00

TABLE 3a THE HAWAII QUARTERS MONTHLY BASE RENT CHART
FOR GOOD CONDITION 4 BEDROOM, 1 BATHROOM HOUSES

SQFT	5 YRS OLD	15 YRS OLD	25 YRS OLD	35 YRS OLD	45 YRS OLD	55 YRS OLD	75+ YRS OLD	PER EXTRA BATH ROOM	EXCEL EXTER -IOR/ INTER -IOR*	FAIR EXTER -IOR/ INTER -IOR*	POOR EXTER -IOR/ INTER -IOR*	A/C (REF)	GAR-AGE PER (CAR)	PLEX
700	$941	$869	$832	$806	$787	$771	$747	$+238	$+17	$-17	$-22	$+30	$+116	$-113
800	$968	$896	$858	$833	$814	$798	$774	$+238	$+17	$-17	$-22	$+30	$+116	$-113
900	$995	$923	$885	$860	$840	$825	$800	$+238	$+17	$-17	$-22	$+30	$+116	$-113
1000	$1021	$950	$912	$887	$867	$852	$827	$+238	$+17	$-17	$-22	$+30	$+116	$-113
1100	$1048	$976	$939	$913	$894	$878	$854	$+238	$+17	$-17	$-22	$+30	$+116	$-113
1200	$1075	$1003	$966	$940	$921	$905	$881	$+238	$+17	$-17	$-22	$+30	$+116	$-113
1300	$1102	$1030	$992	$967	$948	$932	$908	$+238	$+17	$-17	$-22	$+30	$+116	$-113
1400	$1129	$1057	$1019	$994	$974	$959	$934	$+238	$+17	$-17	$-22	$+30	$+116	$-113
1500	$1155	$1084	$1046	$1021	$1001	$986	$961	$+238	$+17	$-17	$-22	$+30	$+116	$-113
1600	$1182	$1110	$1073	$1047	$1028	$1012	$988	$+238	$+17	$-17	$-22	$+30	$+116	$-113
1700	$1209	$1137	$1100	$1074	$1055	$1039	$1015	$+238	$+17	$-17	$-22	$+30	$+116	$-113
1800	$1236	$1164	$1126	$1101	$1082	$1066	$1042	$+238	$+17	$-17	$-22	$+30	$+116	$-113
1900	$1263	$1191	$1153	$1128	$1108	$1093	$1068	$+238	$+17	$-17	$-22	$+30	$+116	$-113
2000	$1289	$1218	$1180	$1155	$1135	$1120	$1095	$+238	$+17	$-17	$-22	$+30	$+116	$-113
2100	$1316	$1244	$1207	$1181	$1162	$1146	$1122	$+238	$+17	$-17	$-22	$+30	$+116	$-113
2200	$1343	$1271	$1234	$1208	$1189	$1173	$1149	$+238	$+17	$-17	$-22	$+30	$+116	$-113
2300	$1370	$1298	$1260	$1235	$1216	$1200	$1176	$+238	$+17	$-17	$-22	$+30	$+116	$-113

ADDITIONAL ADJUSTMENTS:

STRUCTURAL ADJUSTMENTS:
CARPORT ADD $63

COMMUNITY ADJUSTMENTS:

HILO, HI -$271 KAPAA, HI -$90;

* - IF BOTH THE INTERIOR AND EXTERIOR ARE IN THIS CONDITION, APPLY THIS FACTOR TWICE.

REGARDLESS OF ADJUSTMENTS, THE MINIMUM BASE RENT IS $260 PER MONTH.

THE APPROPRIATE CPI FACTOR SHOULD BE APPLIED AFTER COMPLETING THE ABOVE ADJUSTMENTS.

TABLE 3b THE HAWAII QUARTERS MONTHLY BASE RENT CHART
FOR GOOD CONDITION 3 BEDROOM, 1 BATHROOM HOUSES

SQFT	5 YRS OLD	15 YRS OLD	25 YRS OLD	35 YRS OLD	45 YRS OLD	55 YRS OLD	75+ YRS OLD	PER EXTRA BATH ROOM	EXCEL EXTER -IOR/ INTER -IOR*	FAIR EXTER -IOR/ INTER -IOR*	POOR EXTER -IOR/ INTER -IOR*	A/C (REF)	GAR-AGE PER (CAR)	PLEX
500	$854	$782	$745	$719	$700	$684	$660	$+238	$+17	$-17	$-22	$+30	$+116	$-113
600	$874	$802	$765	$739	$720	$704	$680	$+238	$+17	$-17	$-22	$+30	$+116	$-113
700	$894	$822	$785	$759	$740	$724	$700	$+238	$+17	$-17	$-22	$+30	$+116	$-113
800	$914	$842	$805	$779	$760	$744	$720	$+238	$+17	$-17	$-22	$+30	$+116	$-113
900	$934	$862	$825	$799	$780	$764	$740	$+238	$+17	$-17	$-22	$+30	$+116	$-113
1000	$954	$883	$845	$820	$800	$785	$760	$+238	$+17	$-17	$-22	$+30	$+116	$-113
1100	$974	$903	$865	$840	$820	$805	$780	$+238	$+17	$-17	$-22	$+30	$+116	$-113
1200	$995	$923	$885	$860	$840	$825	$800	$+238	$+17	$-17	$-22	$+30	$+116	$-113
1300	$1015	$943	$905	$880	$860	$845	$820	$+238	$+17	$-17	$-22	$+30	$+116	$-113
1400	$1035	$963	$925	$900	$881	$865	$841	$+238	$+17	$-17	$-22	$+30	$+116	$-113
1500	$1055	$983	$946	$920	$901	$885	$861	$+238	$+17	$-17	$-22	$+30	$+116	$-113
1600	$1075	$1003	$966	$940	$921	$905	$881	$+238	$+17	$-17	$-22	$+30	$+116	$-113
1700	$1095	$1023	$986	$960	$941	$925	$901	$+238	$+17	$-17	$-22	$+30	$+116	$-113
1800	$1115	$1043	$1006	$980	$961	$945	$921	$+238	$+17	$-17	$-22	$+30	$+116	$-113
1900	$1135	$1063	$1026	$1000	$981	$965	$941	$+238	$+17	$-17	$-22	$+30	$+116	$-113
2000	$1155	$1084	$1046	$1021	$1001	$986	$961	$+238	$+17	$-17	$-22	$+30	$+116	$-113
2100	$1175	$1104	$1066	$1041	$1021	$1006	$981	$+238	$+17	$-17	$-22	$+30	$+116	$-113

ADDITIONAL ADJUSTMENTS:

STRUCTURAL ADJUSTMENTS:

CARPORT ADD $63

COMMUNITY ADJUSTMENTS:

HILO, HI -$271 KAPAA, HI -$90;

* - IF BOTH THE INTERIOR AND EXTERIOR ARE IN THIS CONDITION, APPLY THIS FACTOR TWICE.

REGARDLESS OF ADJUSTMENTS, THE MINIMUM BASE RENT IS $260 PER MONTH.

THE APPROPRIATE CPI FACTOR SHOULD BE APPLIED AFTER COMPLETING THE ABOVE ADJUSTMENTS.

TABLE 3c THE HAWAII QUARTERS MONTHLY BASE RENT CHART
FOR GOOD CONDITION 2 BEDROOM, 1 BATHROOM HOUSES

SQFT	5 YRS OLD	15 YRS OLD	25 YRS OLD	35 YRS OLD	45 YRS OLD	55 YRS OLD	75+ YRS OLD	PER EXTRA BATH ROOM	EXCEL EXTER -IOR/ INTER -IOR*	FAIR EXTER -IOR/ INTER -IOR*	POOR EXTER -IOR/ INTER -IOR*	A/C (REF)	GAR-AGE PER (CAR)	PLEX
300	$794	$722	$684	$659	$639	$624	$599	$+238	$+17	$-17	$-22	$+30	$+116	$-113
400	$807	$735	$698	$672	$653	$637	$613	$+238	$+17	$-17	$-22	$+30	$+116	$-113
500	$820	$749	$711	$686	$666	$651	$626	$+238	$+17	$-17	$-22	$+30	$+116	$-113
600	$834	$762	$724	$699	$680	$664	$640	$+238	$+17	$-17	$-22	$+30	$+116	$-113
700	$847	$775	$738	$712	$693	$677	$653	$+238	$+17	$-17	$-22	$+30	$+116	$-113
800	$861	$789	$751	$726	$706	$691	$666	$+238	$+17	$-17	$-22	$+30	$+116	$-113
900	$874	$802	$765	$739	$720	$704	$680	$+238	$+17	$-17	$-22	$+30	$+116	$-113
1000	$887	$816	$778	$753	$733	$718	$693	$+238	$+17	$-17	$-22	$+30	$+116	$-113
1100	$901	$829	$791	$766	$747	$731	$707	$+238	$+17	$-17	$-22	$+30	$+116	$-113
1200	$914	$842	$805	$779	$760	$744	$720	$+238	$+17	$-17	$-22	$+30	$+116	$-113
1300	$928	$856	$818	$793	$773	$758	$733	$+238	$+17	$-17	$-22	$+30	$+116	$-113
1400	$941	$869	$832	$806	$787	$771	$747	$+238	$+17	$-17	$-22	$+30	$+116	$-113
1500	$954	$883	$845	$820	$800	$785	$760	$+238	$+17	$-17	$-22	$+30	$+116	$-113
1600	$968	$896	$858	$833	$814	$798	$774	$+238	$+17	$-17	$-22	$+30	$+116	$-113
1700	$981	$909	$872	$846	$827	$811	$787	$+238	$+17	$-17	$-22	$+30	$+116	$-113
1800	$995	$923	$885	$860	$840	$825	$800	$+238	$+17	$-17	$-22	$+30	$+116	$-113
1900	$1008	$936	$899	$873	$854	$838	$814	$+238	$+17	$-17	$-22	$+30	$+116	$-113

ADDITIONAL ADJUSTMENTS:

STRUCTURAL ADJUSTMENTS:
CARPORT ADD $63

COMMUNITY ADJUSTMENTS:

HILO, HI -$271 KAPAA, HI -$90;

* - IF BOTH THE INTERIOR AND EXTERIOR ARE IN THIS CONDITION, APPLY THIS FACTOR TWICE.

REGARDLESS OF ADJUSTMENTS, THE MINIMUM BASE RENT IS $260 PER MONTH.

THE APPROPRIATE CPI FACTOR SHOULD BE APPLIED AFTER COMPLETING THE ABOVE ADJUSTMENTS.

TABLE 3d THE HAWAII QUARTERS MONTHLY BASE RENT CHART
FOR GOOD CONDITION 1 BEDROOM, 1 BATHROOM HOUSES

SQFT	5 YRS OLD	15 YRS OLD	25 YRS OLD	35 YRS OLD	45 YRS OLD	55 YRS OLD	75+ YRS OLD	PER EXTRA BATH ROOM	EXCEL EXTER -IOR/ INTER -IOR*	FAIR EXTER -IOR/ INTER -IOR*	POOR EXTER -IOR/ INTER -IOR*	A/C (REF)	GAR- AGE PER (CAR)	PLEX
100	$760	$688	$651	$625	$606	$590	$566	$+238	$+17	$-17	$-22	$+30	$+116	$-113
200	$767	$695	$657	$632	$613	$597	$573	$+238	$+17	$-17	$-22	$+30	$+116	$-113
300	$773	$702	$664	$639	$619	$604	$579	$+238	$+17	$-17	$-22	$+30	$+116	$-113
400	$780	$708	$671	$645	$626	$610	$586	$+238	$+17	$-17	$-22	$+30	$+116	$-113
500	$787	$715	$678	$652	$633	$617	$593	$+238	$+17	$-17	$-22	$+30	$+116	$-113
600	$794	$722	$684	$659	$639	$624	$599	$+238	$+17	$-17	$-22	$+30	$+116	$-113
700	$800	$728	$691	$665	$646	$630	$606	$+238	$+17	$-17	$-22	$+30	$+116	$-113
800	$807	$735	$698	$672	$653	$637	$613	$+238	$+17	$-17	$-22	$+30	$+116	$-113
900	$814	$742	$704	$679	$659	$644	$619	$+238	$+17	$-17	$-22	$+30	$+116	$-113
1000	$820	$749	$711	$686	$666	$651	$626	$+238	$+17	$-17	$-22	$+30	$+116	$-113
1100	$827	$755	$718	$692	$673	$657	$633	$+238	$+17	$-17	$-22	$+30	$+116	$-113
1200	$834	$762	$724	$699	$680	$664	$640	$+238	$+17	$-17	$-22	$+30	$+116	$-113
1300	$840	$769	$731	$706	$686	$671	$646	$+238	$+17	$-17	$-22	$+30	$+116	$-113
1400	$847	$775	$738	$712	$693	$677	$653	$+238	$+17	$-17	$-22	$+30	$+116	$-113
1500	$854	$782	$745	$719	$700	$684	$660	$+238	$+17	$-17	$-22	$+30	$+116	$-113

ADDITIONAL ADJUSTMENTS:

STRUCTURAL ADJUSTMENTS:

CARPORT ADD $63

COMMUNITY ADJUSTMENTS:

HILO, HI -$271 KAPAA, HI -$90;

* - IF BOTH THE INTERIOR AND EXTERIOR ARE IN THIS CONDITION, APPLY THIS FACTOR TWICE.

REGARDLESS OF ADJUSTMENTS, THE MINIMUM BASE RENT IS $260 PER MONTH.

THE APPROPRIATE CPI FACTOR SHOULD BE APPLIED AFTER COMPLETING THE ABOVE ADJUSTMENTS.

C. APARTMENTS

For all apartment units, use the rental chart which appropriately describes the housing class and the number of bedrooms of the subject quarters. The chart for apartments is in Tables 4a.

Assume a 2-bedroom, 1 1/2-bathroom apartment, near Honolulu, HI with 760 square feet. The exterior is in poor condition; the interior is in good condition. The apartment, which was built in 1957, is 45 years old (2002 - 1956), has a carport, and central refrigerated air conditioning.

First, refer to the apartment chart (Table 4a). This chart is a baseline chart, which assumes that each apartment is in good condition inside and outside and has one full bathroom. Therefore, if the apartment is in good condition inside and outside and has one bathroom, no additional computations are needed. If there is a deviation from either good inside or outside condition or there are less or more bathrooms than one, then the computations must be changed as discussed below. In the first step, Table 4a is selected as the proper chart for this apartment.

In the second step the size (gross living area) is rounded **down** from 760 to 700 square feet. Under the column headed **"SQFT"** the figure 700 should be located. All further adjustments will be taken from this row.

In the third step the appropriate age column is selected. A 45-year old apartment is between 35 and 45 years old; therefore, the **"45 YRS OLD"** column should be used. An apartment, in good condition with 700 square feet of living space (gross), and which is 45 years of age, has a "Table Rent" of $506 per month.

The first adjustment is the extra bathroom adjustment charge. Following the 700 SQFT row along to the column headed **"PER EXTRA BATHROOM"** you will find a charge of $203. To compute the charge for the extra ½ bathroom, multiply .5(1/2 extra bath) times $203 (the extra bath charge). Add $101.50 to the rent.

The second adjustment is for a poor exterior condition. Follow the 700 SQFT row across the table to the column headed **"POOR EXTERIOR/INTERIOR*"** a deduction of $15 is shown. Table 4a assumes the condition to be good and since, in our example, the apartment's interior condition is good, no adjustment is needed for interior condition. Subtract from the rent $15 for poor exterior condition.

The third adjustment is for a carport. Beneath the table, under **"STRUCTURAL ADJUSTMENT",** there is an instruction to add $72 for a carport of any size. As instructed add $72 to the rent of this apartment.

The fourth adjustment is for central refrigerated air conditioning. Beneath the table, under **"STRUCTURAL ADJUSTMENT"**, there is an instruction to add $45 for Central Refrigerated Air Conditioning.

The final adjustment is the community adjustment. The apartment in this example is located near Honolulu, HI. The notes beneath the table (see "**COMMUNITY ADJUSTMENTS**") show no adjustment for Honolulu, HI. Therefore, rental values in Honolulu, HI for apartments are equal to or

greater than the regional average. Since positive community adjustments are not applied, no community adjustment is shown for Honolulu, HI.

The last step is rounding the resulting MBRR (Monthly Base Rental Rate) to the nearest whole dollar. Any amount resulting in an amount of $.50 or greater is rounded up; any amount resulting in an amount of $.49 or less is rounded down. The decision to round is discretionary.

In summary, the Monthly Base Rental Rate for the apartment in this example is determined as follows:

Table Rent (700 SQFT/45 years old)	$506.00
Extra Bath Adjustment (.5 X $203)	+101.50
Poor Exterior Adjustment	-15.00
Carport Adjustment	+72.00
Central Refrigerated Air Conditioning Adjustment	+45.00
Location Adjustment (Honolulu, HI)	- 00.00
Monthly Base Rental Rate	$709.50
Monthly Base Rent (Rounded)	$710.00

TABLE 4a THE HAWAII QUARTERS MONTHLY BASE RENT CHART
FOR GOOD CONDITION ANY # BEDROOM, 1 BATHROOM APARTMENTS

SQFT	5 YRS OLD	15 YRS OLD	25 YRS OLD	35 YRS OLD	45 YRS OLD	55 YRS OLD	75+ YRS OLD	PER EXTRA BATH ROOM	EXCEL EXTER IOR/ INTER IOR*	FAIR EXTER- IOR/ INTER- IOR*	POOR EXTER- IOR/ INTER- IOR*	GAR- AGE (ANY SIZE)
100	$536	$441	$391	$358	$332	$311	$279	$+29	$+10	$-10	$-15	$+80
200	$565	$470	$420	$387	$361	$340	$308	$+58	$+10	$-10	$-15	$+80
300	$594	$499	$449	$416	$390	$369	$337	$+87	$+10	$-10	$-15	$+80
400	$623	$528	$478	$445	$419	$398	$366	$+116	$+10	$-10	$-15	$+80
500	$652	$557	$507	$474	$448	$427	$395	$+145	$+10	$-10	$-15	$+80
600	$681	$586	$536	$503	$477	$456	$424	$+174	$+10	$-10	$-15	$+80
700	$710	$615	$565	$532	$506	$485	$453	$+203	$+10	$-10	$-15	$+80
800	$739	$644	$594	$561	$535	$514	$482	$+232	$+10	$-10	$-15	$+80
900	$768	$673	$623	$590	$564	$543	$511	$+261	$+10	$-10	$-15	$+80
1000	$797	$702	$652	$619	$593	$572	$540	$+290	$+10	$-10	$-15	$+80
1100	$826	$731	$681	$648	$622	$601	$569	$+290	$+10	$-10	$-15	$+80
1200	$855	$760	$710	$677	$651	$630	$598	$+290	$+10	$-10	$-15	$+80
1300	$884	$789	$739	$706	$680	$659	$627	$+290	$+10	$-10	$-15	$+80
1400	$913	$818	$768	$735	$709	$688	$656	$+290	$+10	$-10	$-15	$+80
1500	$942	$847	$797	$764	$738	$717	$685	$+290	$+10	$-10	$-15	$+80
1600	$971	$876	$826	$793	$767	$746	$714	$+290	$+10	$-10	$-15	$+80
1700	$1000	$905	$855	$822	$796	$775	$743	$+290	$+10	$-10	$-15	$+80
1800	$1029	$934	$884	$851	$825	$804	$772	$+290	$+10	$-10	$-15	$+80

ADDITIONAL ADJUSTMENTS:

STRUCTURAL ADJUSTMENTS:

CARPORT (ANY SIZE): ADD $72 CENTRAL REFRIGERATED AIR CONDITIONING ADD $45

COMMUNITY ADJUSTMENTS:

HILO, HI -$58;

*IF BOTH THE EXTERIOR AND INTERIOR ARE IN THIS CONDITION, APPLY THIS FACTOR TWICE.

REGARDLESS OF ADJUSTMENTS, THE MINIMUM BASE RENT IS $260 PER MONTH.

THE APPROPRIATE CPI FACTOR SHOULD BE APPLIED AFTER COMPLETING THE ABOVE ADJUSTMENTS.

D. CABINS OR LOOKOUTS

For purposes of rental rate establishment, the rental housing class most comparable to cabins or lookouts would be 1-bedroom, single-family houses, regardless of the number of bedrooms in the cabin. One-bedroom, single-family rental houses generally consist of smaller and older housing units. Where the cabins or lookouts are outfitted for housekeeping, and contain an independent primary heating system, the rental rates (including all applicable adjustments) are determined by using the 1-bedroom house chart (i.e. Table 3d).

Where a cabin or lookout lacks full housekeeping facilities (including running water, an inside heated bathroom, or a central heating system), additional adjustments (shown below) must be made to the Monthly Base Rental Rate. A free standing stove without a fan, or a fireplace does not qualify as a central primary heating system. These adjustments are designed to take into consideration the inconvenience resulting from the lack of full housekeeping facilities. However, the adjusted monthly base rental rate may not be set below the minimum monthly base rent of $260.

. No Electricity =	- 20%
. No Inside Bathroom =	- 20%
. No Running Water =	- 20%
. No Central Heating System =	- 15% (*)
. Less Than Two Rooms (One-Room Cabin or Lookout) =	- 10%

(*) Applied only if used during the heating season.

E. BUNKHOUSE AND DORMITORIES

Bunkhouses and dormitories should only include housing units that have been specifically constructed or modified for use as bunkhouses or dormitories. Single-family houses, apartments or mobile homes that are **used** as dormitories or bunkhouses, must be valued as what they are (houses, apartments or mobile homes), with the rent divided by the number of **planned** occupants (normally 2 per bedroom).

Dormitory or bunkhouse units typically lack either a living room or kitchen, or have common baths and kitchens serving many people. Many also have multiple bunk beds in large ward-like rooms. Such housing units pose a valuation problem, as they are normally found only in association with institutions such as the military or colleges, of which its occupants are members. Since these institutions do not typically rent to the public at large, one cannot obtain an arms-length market rent.

Under circumstances where there is a lack of comparable rental data, OMB Circular A-45 provides that rental rates may be established using an extension of the Principle of Comparability. Under this procedure, rental rates are established using the most comparable rental housing available, and the rate is essentially 50 percent of the average house rent.

During the February, 1994 National Quarters Conference, the National Quarters Council decided that one aggregate monthly rate should be established for **all** dormitories in a survey region. This aggregate dormitory rate, which includes the value of Government-provided utilities, furnishings and services, was determined as follows. An analysis of the comparables used in this survey found that the average single-family house had 1,179 square feet of finished floor space, 2.6 bedrooms and an average monthly adjusted contract rent of $1,070. By applying an extension of the Principle of Comparability, the Base Shelter Rental Rate (BSRR) for bunkhouses and dormitories is calculated as shown below.

During the 2002 National Quarters Conference, the National Quarters Council reviewed different dormitory costing methods for the newer types of dormitories being built by some agencies. In researching new and existing dormitory models it was found the majority of the dormitories plan to house two occupants per room, which the current costing methodology is based upon. In addition, most occupants in dormitories share both a kitchen and bathroom. Based on these factors the Council decided to continue using the current costing methodology.

Average adjusted contract rent x .5 = $1,070 x .5 = $535.00
$535.00 / (average # of bedrooms x 2 occupants per bedroom)
$535.00 / (2.6 bedrooms x 2 occupants) = $535.00 / 5.2 = $102.90 per month/per occupant

Charges were then added to this rate for utilities, services and furnishings that are provided by the Government. The aggregate value of these items was based on a study of the rates prevailing in the regional survey area. These charges were prorated based upon a 1,179 square foot, 2.6 bedroom, single-family house occupied by 2 people per bedroom. The aggregate charge for these related facilities is $78.85.

Monthly, weekly, and daily bunkhouse and dormitory rates are computed as follows.

TABLE 5 BUNKHOUSE/DORMITORY RENTS

HAWAII

Monthly Charge

Dormitory Rate $102.90
Related Facilities Charges $78.85

MBRR $181.75

Bi-Weekly Charge

To convert to bi-weekly rate
multiply MBRR by .4615 and
round to nearest five cents $83.90

Weekly Charge

To convert to weekly rate
multiply MBRR by .2308 and
round to nearest five cents $41.95

Daily Charge

To convert to daily rate
multiply MBRR by .0333 and
round to nearest five cents .....$ 6.05

Note: An administrative adjustment of -10% is permitted if 3 or more people must share a bedroom or sleeping area. Also, an administrative adjustment of –10% is permitted for dormitories that lack kitchen or cooking facilities.

F. TRANSIENT QUARTERS

Transient quarters are those which are occupied on a transient basis, normally for a period of 90 days or less. Government provided transient quarters offer a range of accommodations. At some locations kitchen facilities, private telephones and private bathrooms may be available; at others, they are not provided. At some locations, maid service is provided (with varying degrees of frequency); at other locations, employees are "issued" bedding and other domestic items, and must take care of their own house keeping arrangements.

Given the diversity of facilities and services associated with Government-provided transient quarters, the QMIS National Quarters Council determined that private housing, comparable to Government transient quarters, generally does not exist. Accordingly, the rental charges for transient quarters have been established by extending the principle of comparability, as provided in OMB Circular A-45.

Essentially, the rental charge for transient quarters is the sum of the monthly dormitory rate (see Table 5); a monthly charge for maid service (Table 16); and a 20 percent administrative/service charge required by OMB Circular A-45 paragraph 7.c (4)(a). Monthly, weekly and daily charges for transient quarters are shown, below, in Table 6.

TABLE 6 TRANSIENT QUARTERS RENTS

Dormitory BSRR	$102.90
Related Facilities Charges (Table 5)	78.85
Maid Service (Table 16)	67.75
Subtotal	$249.50
Administrative Charge (OMB Cir. A-45)	x 1.20
Total (Rounded)	$299.40
Monthly Charge (Rounded)	$299.40
Bi-Weekly Charge ($299.40 x .4615 Rounded)	$138.15
Weekly Charge ($299.40 x .2308 Rounded)	$69.10
Daily Charge ($299.40 x .0333 Rounded)	$9.95

VI. CHARGES FOR UTILITIES, APPLIANCES AND RELATED SERVICES

A. BACKGROUND

OMB Circular A-45 requires that, whenever possible, utilities should be provided by a private company and billed directly to quarters occupants. Where Government-furnished utilities are provided, they should be metered or measured. When Government-furnished utilities are not metered or measured, consumption will be determined from an analysis of the average amounts of utilities used in comparable private housing in the nearest established community or survey area. **Where the Government furnishes utilities, and where the quarters rental rates are established by the regional survey method, the utility rates shall be the regional average utility rates prescribed in this report - not the rates prevailing in the nearest established community.**

The regional average utility rates contained in this report include all applicable delivery charges, adjustments, taxes and surcharges. Charges for Government-provided appliances, services and furnishings will be based upon nationwide average costs.

The following sections of this report detail the consumption and cost data to be used in the circumstances described above. The cost data in this report will be updated by the QMIS Program Office each year and distributed with the Consumer Price Index (CPI) adjustment that takes effect each year.

B. ENERGY CONSUMPTION STUDY

1. **General**. Energy consumption estimates are required where the Government furnishes the space heating or cooling fuel and the electricity, and where consumption is neither metered nor measured. In such instances, average energy consumption must be estimated and the Government must assess a charge based on private sector energy costs in the survey area. No methodology for estimating energy consumption can exactly predict the amounts of energy needed to heat or cool specific dwellings. Precise consumption measurements are possible only when metering is used. However, the methodology used in this report will yield **reasonable** estimates of the heating and cooling energy consumption requirements of unmetered dwellings. The methodology employed in this section was contractor-developed. For this report, however, the contractor-provided tables and conversion charts have been reformatted, and the methodology has been restated to simplify the process of estimating energy consumption requirements. The unit costs for various fuel types and for electricity (e.g., the cost per gallon for fuel oil and propane; the cost per MCF (1,000 cubic feet) for natural gas; and the cost per kWh for electricity) are regional averages of the unit fuel/electricity prices gathered by the contractor in each community surveyed.

2. **Housing Prototypes**. For the Hawaii energy study, estimates of the heating and cooling energy requirements were prepared for each of the following five prototypical housing units.

   Type I - Single family, one story, no basement

Type II - Single family, one story, full basement

Type III - Single family, two story, no basement

Type IV - Single family, two story, full basement

Type V - Apartment unit

3. **Assumptions**. For each of the housing prototypes, the following assumptions were made:

   a. Location. - The housing is located in Hilo, HI.

   b. R values. - Each housing type has the R values of insulation in floors, walls, and ceilings recommended in the HUD Minimum Property Standards (HUD-MPS) for the Hilo, HI area.

   c. Occupants. - The housing contains an average compliment of occupants who are energy conscious (one person per 500 feet of floor space was assumed).

   d. All measurements are of finished living space only and are based upon exterior dimensions.

   e. Condition. - The housing is in good condition.

   f. Building shape. - A rectangular shape with a ratio of 2:1 was established. This provides more building skin than a square configuration therefore, the rectangular shape yields a conservative estimate of skin loads.

   g. Window area. - A window area of 10 percent of wall area was used to match UBC (Uniform Building Code) minimum window area standards.

   h. Roof type. - A flat or pitched roof with ceiling insulation was assumed in all cases.

   i. Air changes. - 1.5 air changes per hour was established as representing a conservative estimate of air changes in residential applications.

   j. Perimeter loss. - Approximately 10 percent of overall building load is attributed to the slab on grade floors with rigid insulation to a value of R-6.

4. Using the above assumptions, infiltration factors developed by the Department of Energy, R values, building dimensions, and cooling and heating degree days, a contractor has formulated methodologies for estimating British Thermal Unit (BTU) and kilowatt hour (kWh) consumption rates, and costs, for heating and cooling. The relevant portions of the methodology are explained below.

C. SPACE HEATING (FOSSIL FUEL) CONSUMPTION/COST CALCULATIONS

To illustrate the procedure for calculating the cost of heating with fossil fuel, a single story 1,850 square foot house, with no basement, located near Haleakala National Park will be used as an example.

1. The first step is to select from among Tables 7a through 7f, the table which most closely describes the quarters unit at issue. In this case, Table 7a is for a 1-story, single family house with a partial (50 percent or less) or no basement (Prototype I). When determining the prototype, use the total basement (finished and unfinished) square footage. Unfinished space is only considered when determining the prototype. It is never used when using a rent setting or consumption chart. Table 7a should be selected in this example.

2. The second step is to determine the number of BTU's consumed **annually** for heating the house used in this example. Select from Table 7a the annual MBTU (million BTU's) consumption appropriate for the heating degree days (HDD's) and the gross **finished** square footage of the house in this example. Use the table as shown below.

   a. Find the number of HDD's for the established community near which the quarters are located. Table 8 contains the HDD's for the nearest established communities in the Hawaii survey region; this table shows that Haleakala, N.P. has 4,118 HDD's. In Table 7a, 4,118 HDD's lies between the columns headed **"4,000"** and **"4,250".** Round 4,118 HDD's down to 4,000 HDD's.

   b. In Table 7a, 1,850 square feet (the size of the house used in the example) lies between 1,800 and 2,000 square feet; round 1,850 down to 1,800 square feet.

   c. From Table 7a (1,800 square feet and 4,000 HDD's) the annual MBTU consumption rate is 81.1 MBTU's.

3. The third step is to calculate the amount of fossil fuel needed to produce 81.1 MBTU's. Table 9 shows the amount of fossil fuel needed to produce 1 MBTU. The total amount of heating fuel required to produce 81.1 MBTU's is computed by multiplying the appropriate fuel factor in Table9 by the number of MBTU's. In this case the fuel required is:

Natural gas:	81.1 MBTU's x 1 MCF	=	81.1 MCF.
Propane:	81.1 MBTU's x 10.2 gallons	=	827.22 gallons
Fuel oil:	81.1 MBTU's x 7.04 gallons	=	570.94 gallons

4. The fourth step is to calculate the annual cost of the fuel consumed. This can be done by multiplying the annual fuel consumption by the unit fuel charges shown in Table 10. Following this procedure, the charge for fuel consumed annually to produce 81.1 MBTU's is:

Natural gas:	81.1 MCF x $27.27 (per MCF)	=	$2,211.60
Propane:	827.22 gallons x $2.54(per gallon)	=	$2,101.14
Fuel oil:	570.94 gallons x $1.17 (per gallon)	=	$668.00

5. The fifth step is to calculate the monthly charge for fossil heating fuel. This is done simply by dividing the annual charges (above) by 12 (months). In this manner the monthly charges are: natural gas = $184.30; propane = $175.10 and fuel oil = $55.67.

6. The final step is to multiply the monthly charge (computed in step 5 above) by the appropriate HUD MPS Heating Zone conversion factor (Table 11). In order to use Table 11, it is first necessary to determine the HUD MPS Zone for the community at issue (Haleakala N.P.). Table 8 shows the HUD MPS Zones for the nearest established communities located within the Hawaii survey region. From Table 8, it can be seen that Haleakala N.P. is in MPS Zone 1. The conversion factor can now be found in Table 11. The conversion factor for a single story dwelling with no basement (Prototype I) in HUD MPS Zone 1 is 1.00. Multiply the monthly charges determined in step 5 above by 1.00 (the conversion factor). In this manner, the heating fuel charge can be computed for any quarters unit in any community or location. In this example, the final monthly fossil fuel heating costs are $184.30 ($184.30 x 1.00) for natural gas, $175.10 ($175.10 x 1.00) for propane and $55.67 ($55.67 x 1.00) for fuel oil.

The above example pertained to a single story dwelling with a partial (50 percent or less) or no basement. When calculating the heating fuel charge for a different type of housing (including apartments), use the Table (7a through e) which most closely describes the quarters unit to compute the annual MBTU consumption.

TABLE 7a ANNUAL MBTU USAGE (MILLIONS BTU'S) - PROTOTYPE I
Single Family, One Story, Partial (Less Than 50%) or No Basement

BASELINE CITY, Hilo,Hawaii

Gross Square Feet	Heating Degree Days																
	100	200	500	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750	4000	4250
100	0.1	0.2	0.6	1.1	1.4	1.7	2.0	2.3	2.5	2.8	3.1	3.4	3.7	3.9	4.2	4.5	4.8
200	0.2	0.5	1.1	2.3	2.8	3.4	3.9	4.5	5.1	5.6	6.2	6.8	7.3	7.9	8.4	9.0	9.6
400	0.5	0.9	2.3	4.5	5.6	6.8	7.9	9.0	10.1	11.3	12.4	13.5	14.6	15.8	16.9	18.0	19.1
600	0.7	1.4	3.4	6.8	8.4	10.1	11.8	13.5	15.2	16.9	18.6	20.3	22.0	23.6	25.3	27.0	28.7
800	0.9	1.8	4.5	9.0	11.3	13.5	15.8	18.0	20.3	22.5	24.8	27.0	29.3	31.5	33.8	36.0	38.3
1000	1.1	2.3	5.6	11.3	14.1	16.9	19.7	22.5	25.3	28.2	31.0	33.8	36.6	39.4	42.2	45.0	47.9
1200	1.4	2.7	6.8	13.5	16.9	20.3	23.6	27.0	30.4	33.8	37.2	40.5	43.9	47.3	50.7	54.1	57.4
1400	1.6	3.2	7.9	15.8	19.7	23.6	27.6	31.5	35.5	39.4	43.4	47.3	51.2	55.2	59.1	63.1	67.0
1600	1.8	3.6	9.0	18.0	22.5	27.0	31.5	36.0	40.5	45.0	49.5	54.1	58.6	63.1	67.6	72.1	76.6
1800	2.0	4.1	10.1	20.3	25.3	30.4	35.5	40.5	45.6	50.7	55.7	60.8	65.9	70.9	76.0	81.1	86.1
2000	2.3	4.5	11.3	22.5	28.2	33.8	39.4	45.0	50.7	56.3	61.9	67.6	73.2	78.8	84.5	90.1	95.7
2200	2.5	5.0	12.4	24.8	31.0	37.2	43.4	49.5	55.7	61.9	68.1	74.3	80.5	86.7	92.9	99.1	105.3
2400	2.7	5.4	13.5	27.0	33.8	40.5	47.3	54.1	60.8	67.6	74.3	81.1	87.8	94.6	101.4	108.1	114.9
2600	2.9	5.9	14.6	29.3	36.6	43.9	51.2	58.6	65.9	73.2	80.5	87.8	95.2	102.5	109.8	117.1	124.4
2800	3.2	6.3	15.8	31.5	39.4	47.3	55.2	63.1	70.9	78.8	86.7	94.6	102.5	110.4	118.2	126.1	134.0
3000	3.4	6.8	16.9	33.8	42.2	50.7	59.1	67.6	76.0	84.5	92.9	101.4	109.8	118.2	126.7	135.1	143.6

TABLE 7b ANNUAL MBTU USAGE (MILLIONS BTU'S) - PROTOTYPE II
Single Family, Single Story, Full Basement

BASELINE CITY, Hilo,Hawaii

Gross Square Feet	Heating Degree Days																
	100	200	500	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750	4000	4250
100	0.1	0.2	0.4	0.9	1.1	1.3	1.5	1.7	2.0	2.2	2.4	2.6	2.8	3.0	3.3	3.5	3.7
200	0.2	0.3	0.9	1.7	2.2	2.6	3.0	3.5	3.9	4.4	4.8	5.2	5.7	6.1	6.5	7.0	7.4
400	0.3	0.7	1.7	3.5	4.4	5.2	6.1	7.0	7.8	8.7	9.6	10.5	11.3	12.2	13.1	13.9	14.8
600	0.5	1.0	2.6	5.2	6.5	7.8	9.1	10.5	11.8	13.1	14.4	15.7	17.0	18.3	19.6	20.9	22.2
800	0.7	1.4	3.5	7.0	8.7	10.5	12.2	13.9	15.7	17.4	19.2	20.9	22.7	24.4	26.1	27.9	29.6
1000	0.9	1.7	4.4	8.7	10.9	13.1	15.2	17.4	19.6	21.8	24.0	26.1	28.3	30.5	32.7	34.8	37.0
1200	1.0	2.1	5.2	10.5	13.1	15.7	18.3	20.9	23.5	26.1	28.7	31.4	34.0	36.6	39.2	41.8	44.4
1400	1.2	2.4	6.1	12.2	15.2	18.3	21.3	24.4	27.4	30.5	33.5	36.6	39.6	42.7	45.7	48.8	51.8
1600	1.4	2.8	7.0	13.9	17.4	20.9	24.4	27.9	31.4	34.8	38.3	41.8	45.3	48.8	52.3	55.8	59.2
1800	1.6	3.1	7.8	15.7	19.6	23.5	27.4	31.4	35.3	39.2	43.1	47.0	51.0	54.9	58.8	62.7	66.6
2000	1.7	3.5	8.7	17.4	21.8	26.1	30.5	34.8	39.2	43.6	47.9	52.3	56.6	61.0	65.3	69.7	74.1
2200	1.9	3.8	9.6	19.2	24.0	28.7	33.5	38.3	43.1	47.9	52.7	57.5	62.3	67.1	71.9	76.7	81.5
2400	2.1	4.2	10.5	20.9	26.1	31.4	36.6	41.8	47.0	52.3	57.5	62.7	68.0	73.2	78.4	83.6	88.9
2600	2.3	4.5	11.3	22.7	28.3	34.0	39.6	45.3	51.0	56.6	62.3	68.0	73.6	79.3	84.9	90.6	96.3
2800	2.4	4.9	12.2	24.4	30.5	36.6	42.7	48.8	54.9	61.0	67.1	73.2	79.3	85.4	91.5	97.6	103.7
3000	2.6	5.2	13.1	26.1	32.7	39.2	45.7	52.3	58.8	65.3	71.9	78.4	84.9	91.5	98.0	104.5	111.1

TABLE 7c ANNUAL MBTU USAGE (MILLIONS BTU'S) - PROTOTYPE III
Single Family, Two Story, Partial (Less Than 50%) or No Basement

BASELINE CITY, Hilo,Hawaii

Gross Square Feet	Heating Degree Days																
	100	200	500	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750	4000	4250
100	0.1	0.2	0.5	1.0	1.2	1.5	1.7	2.0	2.2	2.5	2.7	2.9	3.2	3.4	3.7	3.9	4.2
200	0.2	0.4	1.0	2.0	2.5	2.9	3.4	3.9	4.4	4.9	5.4	5.9	6.4	6.9	7.4	7.9	8.3
400	0.4	0.8	2.0	3.9	4.9	5.9	6.9	7.9	8.8	9.8	10.8	11.8	12.8	13.7	14.7	15.7	16.7
600	0.6	1.2	2.9	5.9	7.4	8.8	10.3	11.8	13.2	14.7	16.2	17.7	19.1	20.6	22.1	23.6	25.0
800	0.8	1.6	3.9	7.9	9.8	11.8	13.7	15.7	17.7	19.6	21.6	23.6	25.5	27.5	29.4	31.4	33.4
1000	1.0	2.0	4.9	9.8	12.3	14.7	17.2	19.6	22.1	24.5	27.0	29.4	31.9	34.3	36.8	39.3	41.7
1200	1.2	2.4	5.9	11.8	14.7	17.7	20.6	23.6	26.5	29.4	32.4	35.3	38.3	41.2	44.2	47.1	50.0
1400	1.4	2.7	6.9	13.7	17.2	20.6	24.0	27.5	30.9	34.3	37.8	41.2	44.7	48.1	51.5	55.0	58.4
1600	1.6	3.1	7.9	15.7	19.6	23.6	27.5	31.4	35.3	39.3	43.2	47.1	51.0	55.0	58.9	62.8	66.7
1800	1.8	3.5	8.8	17.7	22.1	26.5	30.9	35.3	39.7	44.2	48.6	53.0	57.4	61.8	66.2	70.7	75.1
2000	2.0	3.9	9.8	19.6	24.5	29.4	34.3	39.3	44.2	49.1	54.0	58.9	63.8	68.7	73.6	78.5	83.4
2200	2.2	4.3	10.8	21.6	27.0	32.4	37.8	43.2	48.6	54.0	59.4	64.8	70.2	75.6	81.0	86.4	91.8
2400	2.4	4.7	11.8	23.6	29.4	35.3	41.2	47.1	53.0	58.9	64.8	70.7	76.5	82.4	88.3	94.2	100.1
2600	2.6	5.1	12.8	25.5	31.9	38.3	44.7	51.0	57.4	63.8	70.2	76.5	82.9	89.3	95.7	102.1	108.4
2800	2.7	5.5	13.7	27.5	34.3	41.2	48.1	55.0	61.8	68.7	75.6	82.4	89.3	96.2	103.0	109.9	116.8
3000	2.9	5.9	14.7	29.4	36.8	44.2	51.5	58.9	66.2	73.6	81.0	88.3	95.7	103.0	110.4	117.8	125.1

TABLE 7d ANNUAL MBTU USAGE (MILLIONS BTU'S) - PROTOTYPE IV
Single Family, Two Story, Full Basement

BASELINE CITY, Hilo,Hawaii

Gross Square Feet	Heating Degree Days																
	100	200	500	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750	4000	4250
100	0.1	0.2	0.5	1.1	1.3	1.6	1.9	2.2	2.4	2.7	3.0	3.2	3.5	3.8	4.0	4.3	4.6
200	0.2	0.4	1.1	2.2	2.7	3.2	3.8	4.3	4.9	5.4	5.9	6.5	7.0	7.5	8.1	8.6	9.2
400	0.4	0.9	2.2	4.3	5.4	6.5	7.5	8.6	9.7	10.8	11.9	12.9	14.0	15.1	16.2	17.2	18.3
600	0.6	1.3	3.2	6.5	8.1	9.7	11.3	12.9	14.6	16.2	17.8	19.4	21.0	22.6	24.3	25.9	27.5
800	0.9	1.7	4.3	8.6	10.8	12.9	15.1	17.2	19.4	21.6	23.7	25.9	28.0	30.2	32.3	34.5	36.6
1000	1.1	2.2	5.4	10.8	13.5	16.2	18.9	21.6	24.3	26.9	29.6	32.3	35.0	37.7	40.4	43.1	45.8
1200	1.3	2.6	6.5	12.9	16.2	19.4	22.6	25.9	29.1	32.3	35.6	38.8	42.0	45.3	48.5	51.7	55.0
1400	1.5	3.0	7.5	15.1	18.9	22.6	26.4	30.2	34.0	37.7	41.5	45.3	49.0	52.8	56.6	60.4	64.1
1600	1.7	3.4	8.6	17.2	21.6	25.9	30.2	34.5	38.8	43.1	47.4	51.7	56.0	60.4	64.7	69.0	73.3
1800	1.9	3.9	9.7	19.4	24.3	29.1	34.0	38.8	43.7	48.5	53.4	58.2	63.1	67.9	72.8	77.6	82.5
2000	2.2	4.3	10.8	21.6	26.9	32.3	37.7	43.1	48.5	53.9	59.3	64.7	70.1	75.5	80.8	86.2	91.6
2200	2.4	4.7	11.9	23.7	29.6	35.6	41.5	47.4	53.4	59.3	65.2	71.1	77.1	83.0	88.9	94.9	100.8
2400	2.6	5.2	12.9	25.9	32.3	38.8	45.3	51.7	58.2	64.7	71.1	77.6	84.1	90.5	97.0	103.5	109.9
2600	2.8	5.6	14.0	28.0	35.0	42.0	49.0	56.0	63.1	70.1	77.1	84.1	91.1	98.1	105.1	112.1	119.1
2800	3.0	6.0	15.1	30.2	37.7	45.3	52.8	60.4	67.9	75.5	83.0	90.5	98.1	105.6	113.2	120.7	128.3
3000	3.2	6.5	16.2	32.3	40.4	48.5	56.6	64.7	72.8	80.8	88.9	97.0	105.1	113.2	121.3	129.3	137.4

TABLE 7e ANNUAL MBTU USAGE (MILLIONS BTU'S) - PROTOTYPE V
Apartments

BASELINE CITY, Hilo,Hawaii

Gross Square Feet	Heating Degree Days																
	100	200	500	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750	4000	4250
100	0.1	0.1	0.4	0.7	0.9	1.1	1.2	1.4	1.6	1.8	2.0	2.1	2.3	2.5	2.7	2.8	3.0
200	0.1	0.3	0.7	1.4	1.8	2.1	2.5	2.8	3.2	3.6	3.9	4.3	4.6	5.0	5.3	5.7	6.0
400	0.3	0.6	1.4	2.8	3.6	4.3	5.0	5.7	6.4	7.1	7.8	8.5	9.3	10.0	10.7	11.4	12.1
600	0.4	0.9	2.1	4.3	5.3	6.4	7.5	8.5	9.6	10.7	11.7	12.8	13.9	14.9	16.0	17.1	18.1
800	0.6	1.1	2.8	5.7	7.1	8.5	10.0	11.4	12.8	14.2	15.7	17.1	18.5	19.9	21.3	22.8	24.2
1000	0.7	1.4	3.6	7.1	8.9	10.7	12.5	14.2	16.0	17.8	19.6	21.3	23.1	24.9	26.7	28.5	30.2
1200	0.9	1.7	4.3	8.5	10.7	12.8	14.9	17.1	19.2	21.3	23.5	25.6	27.8	29.9	32.0	34.2	36.3
1400	1.0	2.0	5.0	10.0	12.5	14.9	17.4	19.9	22.4	24.9	27.4	29.9	32.4	34.9	37.4	39.8	42.3
1600	1.1	2.3	5.7	11.4	14.2	17.1	19.9	22.8	25.6	28.5	31.3	34.2	37.0	39.8	42.7	45.5	48.4
1800	1.3	2.6	6.4	12.8	16.0	19.2	22.4	25.6	28.8	32.0	35.2	38.4	41.6	44.8	48.0	51.2	54.4
2000	1.4	2.8	7.1	14.2	17.8	21.3	24.9	28.5	32.0	35.6	39.1	42.7	46.3	49.8	53.4	56.9	60.5
2200	1.6	3.1	7.8	15.7	19.6	23.5	27.4	31.3	35.2	39.1	43.0	47.0	50.9	54.8	58.7	62.6	66.5
2400	1.7	3.4	8.5	17.1	21.3	25.6	29.9	34.2	38.4	42.7	47.0	51.2	55.5	59.8	64.0	68.3	72.6
2600	1.9	3.7	9.3	18.5	23.1	27.8	32.4	37.0	41.6	46.3	50.9	55.5	60.1	64.8	69.4	74.0	78.6
2800	2.0	4.0	10.0	19.9	24.9	29.9	34.9	39.8	44.8	49.8	54.8	59.8	64.8	69.7	74.7	79.7	84.7
3000	2.1	4.3	10.7	21.3	26.7	32.0	37.4	42.7	48.0	53.4	58.7	64.0	69.4	74.7	80.1	85.4	90.7

TABLE 8 HEATING/COOLING DEGREE DAYS AND MPS ZONES

Community	Heating Degree Days	Cooling Degree Days	HUD MPS Zone
ISLAND OF HAWAII			
Hawaii Volcanoes NP Hqtrs.	1,467	107	1
Hilo, HI	0	3,228	1
Kailua/Kona, HI	23	2,055	1
Kealakekua/Captain Cook, HI	23	2,055	1
ISLAND OF KAUAI			
Kapaa, HI	0	3,920	1
ISLAND OF MAUI			
Haleakala NP	0	4,118	1
Kahului, HI	0	3,936	1
Pukalani, HI	304	370	1
ISLAND OF MOLOKAI			
Molokai/Kaunakakai, HI	4	3,490	1
ISLAND OF OAHU			
Honolulu, HI	0	4,561	1

TABLE 9 FUEL REQUIRED TO PRODUCE 1 MBTU

Type of Fuel	Amount Needed To Produce 1 MBTU
Natural Gas	1 MCF (1,000 cu. ft.)
Propane	10.2 Gallons
Fuel Oil	7.04 Gallons

TABLE 10 HEATING FUEL COST

Type of Fuel	Charge per unit
Natural Gas	$27.27
Propane	$2.54
Fuel Oil #2	$1.17

TABLE 11 MPS HEATING ZONE CONVERSION FACTORS

	Dwelling Prototypes					
	I	II	III	IV	V	VI
HUD MPS Heating Zone	Single Story No Basement	Single Story Full Basement	Double Story No Basement	Double Story Full Basement	Apart-ments	
1	1.00	1.00	1.00	1.00	1.00	

D. SPACE HEATING (ELECTRICITY) CONSUMPTION/COST CALCULATIONS

The procedure for calculating electrical consumption and costs for space heating (where electricity is unmetered or otherwise unmeasured) is similar to the procedure used for fossil fuels. Tables 12a through 12e are used.

1. Select from these tables the dwelling prototype most similar to the quarters at issue.

2. Determine the annual kilowatt hour (kWh) consumption by finding the appropriate columns for square feet and HDD (heating degree days). Note: HDD's for the nearest established communities may be found in Table 8.

3. Divide the annual kWh by 12 to determine the monthly average electrical consumption.

4. Adjust for HUD MPS Heating Zone, using the conversion factors in Table 11.

5. Adjust for heat pump (if applicable).

6. Determine the appropriate charge per kWh from the table below. **Do not calculate the total cost of electricity in steps such as the first 500 kWh costs so much, then the second 500 kWh costs so much etc.**

kWh Consumed Per Month	Charge per kWh
1 -500	$.194
501 - 1,000	$.187
1,001 -1,500	$.195
Over - 1,500	$.183

7. Compute the monthly charge for space heating by multiplying the appropriate charge per kWh times the number of kWh consumed per month.

8. Example: The average monthly electric heating charge for a single family, 2,100 square foot, two story, no basement home located near Hawaii Volcanoes, HI is computed as follows:

   a. Step 1. Select the table (table 12a through e) which most closely describes the quarters unit at issue. In this case, table 12c (single family, two story, no basement - prototype III) should be selected.

   b. Step 2. Determine from table 12c the annual kWh consumption appropriate for the heating degree days (HDD) and the gross square footage of the house in this example. Use the table as follows:

      1) Find the number of heating degree days for the established community in which the quarters is located. Table 8 (which contains the HDD for established communities in the Hawaii survey region) shows that Hawaii Volcanoes NP Hqtrs. has 1,467 HDD . In table 12c, the

number of HDD's in Hawaii Volcanoes NP Hqtrs .(1,467) lies between the column headed 1,250 and the column headed 1,500. Round down to 1,250 HDD.

2) In table 12c, 2,100 square feet (the size of the house used in this example) lies between 2,000 and 2,200 square feet. Round 2,100 down to 2,000 square feet.

3) From table 12c (2,000 square feet and 1,250 HDD) the annual kWh consumption rate is 5,751 kWh.

c. Step 3. Calculate the monthly kWh consumption by dividing the annual kWh by 12 (months). In this instance, the monthly consumption is 479.25 kWh (5,751 / 12 = 479.25).

d. Step 4, HUD MPS Zone adjustment. The HUD MPS zone adjustment is made as follows:

1) Use Table 8 to find the HUD MPS zone for the community at issue. In this manner, Hawaii Volcanoes NP Hqtrs. is found to be in HUD MPS zone 1.

2) In Table 11, determine the adjustment factor for the appropriate dwelling type and MPS zone. The factor for housing prototype III in HUD MPS zone 1 is 1.00.

3) Multiply the monthly electric consumption (as computed in paragraph 8c, above) times the HUD MPS adjustment factor (479.25 x 1.00 = 479.25 kWh per month).

e. Step 5, **Adjustment for heat pump**. The process described above is used for computing the electrical consumption for heating with a straight resistance heating system. Where a dwelling is heated with an electric heat pump, the straight resistance heating consumption (479.25 kWh in this example) should be multiplied by a factor of .75, which represents the greater efficiency of the heat pump. In this example, the monthly electric consumption for a heat pump as the heating source would be 359.44 (479.25 x .75 = 359.44).

f. Step 6. The final step is to compute the monthly charge for the electricity consumed. This is done by multiplying the charge per kWh times the kWh consumed per month. The appropriate charge per kWh may be found in the table below.

kWh Consumed Per Month	Charge per kWh
1 -500	$.194
501 - 1,000	$.187
1,001 - 1,500	$.195
Over - 1,500	$.183

In this example, the average monthly consumption (479.25 kWh) for resistance heat falls in the "1 - 500" kWh per month consumption category; the appropriate charge is $0.194 per kWh. The average monthly consumption (359.44 kWh) for a heat pump falls in the "1 - 500" kWh per month consumption category; and the appropriate unit charge is $0.194 per kWh.

Therefore, the monthly electric heating charge for the house used in this example is computed as follows:

Resistance heat: 479.25 kWh x $.194 = $92.97

Heatpump: 359.44 kWh x $.194 = $69.73

E. SPACE COOLING CONSUMPTION/COST

Space cooling costs are calculated in the same manner as for electric space heating except that CDD (Cooling Degree Day) values are used in lieu of HDD values. CDD values for the Nearest Established Communities are found in Table 8. Additionally, only Tables 12a through 12e are used in calculating cooling energy consumption. Briefly, the steps are as follows.

1. Select from Tables 12a through 12e, the table that most closely describes the quarters unit at issue.

2. Based on the size of the dwelling (square feet) and the number of CDD (from Table 8), use the appropriate Table (12a-f) to determine the annual kWh consumption.

3. Divide the annual kWh consumption by 12 (months) to determine the average number of kWh consumed per month.

4. Apply the HUD MPS Zone adjustment factor.

5. Apply the Coefficient of Performance (COP) adjustment.

6. Determine the appropriate charge per kWh from the table below.

kWh Consumed Per Month	Charge per kWh
1 - 500	$.194
501 - 1,000	$.187
1,001 - 1,500	$.195
Over - 1,500	$.183

7. Compute the monthly charge for space cooling by multiplying the appropriate charge per kWh times the number of kWh consumed per month.

8. Example: Compute the average monthly electric cooling charge for a 675 SQFT apartment near Hilo, HI.

   a. STEP 1: Table Selection. Select the table (table 12a through 12e) which most closely describes the quarters unit at issue. Table 12e (Apartment - prototype V) should be selected.

   b. STEP 2: Annual kWh Consumption. Determine from table 12e the annual kWh consumption appropriate for the cooling degree days (CDD) and the gross square footage of the apartment in this example. Use the table as follows:

      1) Find the number of cooling degree days for the established community closest to the quarters. Table 8 (which contains the CDD for established communities in the Hawaii survey region) shows that Hilo, HI has 3,228 CDD. In table 12e, 3,228 CDD lies between the columns headed 3,000 and 3,250. Round down to 3,000 CDD.

      2) In table 12e, 675 square feet (the size of the apartment used in this example) lies between 600 and 800 square feet. Round down to 600 square feet.

      3) From table 12e (600 square feet and 3,000 CDD) the annual kWh consumption rate is 3,002 kWh.

   c. STEP 3: Monthly Consumption. Calculate the monthly kWh consumption by dividing the annual kWh consumption by 12 (months). In this instance, the monthly consumption is 250.17 kWh rounded (3,002 / 12 = 250.17).

   d. STEP 4: HUD MPS Zone Adjustment. The HUD MPS Zone adjustment is made as follows:

      1) Use Table 8 to find the HUD MPS zone for the community at issue. In this manner, Hilo, HI is found to be in HUD MPS Zone 1.

      2) In Table 13, determine the adjustment factor for the appropriate dwelling unit type and MPS zone. The factor for housing prototype V in HUD MPS zone 1 is 1.87.

3) Multiply the monthly electric consumption (as computed in paragraph 8c, above) times the HUD MPS Zone adjustment factor 250.17 x 1.87 = 467.82 kWh per month.

e. STEP 5: Adjustment for Coefficient of Performance (COP). This adjustment accounts for the differences in the efficiencies of evaporative (swamp) and refrigerated air central cooling systems.

1) Evaporative (swamp) cooling. For a central evaporative cooling system the adjusted kWh (computed in Step 4, above) is divided by a factor of 6.66. In this example, the monthly kWh requirement for central evaporative cooling is computed as 467.82 / 6.66 = 70.24 kWh per month.

2) Refrigerated air cooling. For a central refrigerated air cooling system, the adjusted kWh (computed in step 4, above) is divided by a factor of 2. In this example, the monthly kWh requirement for central refrigerated air cooling is computed as 467.82 / 2 = 233.91 kWh per month.

f. STEP 6: Monthly Charge. The final step is to compute the monthly charge for the electricity consumed. This is done by multiplying the charge per kWh times the kWh consumed per month. The appropriate charge per kWh may be found in the table below.

kWh Consumed Per Month	Charge per kWh
1 - 500	$.194
501 - 1,000	$.187
1,001 - 1,500	$.195
Over - 1,500	$.183

In this example, the average monthly consumption (70.24 kWh) for evaporative cooling falls in the 1 to 500 kWh consumption range. And (233.91 kWh) for refrigerated cooling falls in the 1 to 500 kWh consumption range. The appropriate charge will be $0.194 per kWh for evaporative cooling and $0.194 for refrigerated cooling.

Therefore, the monthly charges for cooling the apartment used in this example would be computed as follows.

Evaporative cooling : 70.24 kWh x $0.194 = $13.63

Refrigerated cooling: 233.91 kWh x $0.194 = $45.38

9. Gas powered Central Air Conditioning Units. If the central air conditioning unit is gas operated (natural gas or propane), the charge is computed as follows:

a. Compute the kWh consumption in same manner as shown in steps 1 through 4 above (Note: the calculations through step 4 produce 467.82 kWh per month).

b. Calculate the Coefficient of Performance (COP) adjustment in step 5 above for refrigerated air conditioning; that is, divide the number of kWh in paragraph 7a, above (467.82 kWh) by the COP (2); for example 467.82 / 2 = 233.91 kWh.

c. Convert the monthly kWh to MBTU's by dividing the kWh calculated in paragraph 9b, above by 234.4. Thus, 233.91 kWh / 234.4 (kWh per MBTU) = .998 MBTU's. [It takes 234.4 Kilowatts to generate 1 MBTU]

d. Calculate the volumes of natural gas and propane needed to produce .998 MBTU's. This is done as follows.

1) Natural Gas. For central air conditioning units that operate on natural gas, multiply the MBTU's calculated in paragraph 9c above by 1 MCF (0.998 MBTU's x 1 MCF = 0.998 MCF). Thus, 0.998 MCF of natural gas would be required per month (annual average) to cool the dwelling in this example.

2) Propane. For central air conditioning units that operate on propane gas, multiply the MBTU's calculated in paragraph 9c above by 10.2 gallons (0.998 MBTU's x 10.2 gallons = 10.18 gallons). Thus, 10.18 gallons of propane would be required per month (annual average) to cool the dwelling in this example.

e. Calculate the monthly charge for natural gas or propane consumed. This is done by multiplying the volume of fuel consumed by the unit cost of the fuel. These calculations are shown below.

Natural gas: .998 MCF x $27.27 per MCF = $27.22 (rounded) per month.

Propane gas: 10.18 gallons x $2.54 per gallon = $25.86 (rounded) per month.

TABLE 12a ANNUAL KWH USAGE (ELECTRIC HEATING/COOLING) - TYPE I
Single Family, One Story, Partial (Less Than 50%) or No Basement

BASELINE CITY, Hilo, Hawaii

Gross Square Feet	Heating or Cooling Degree Days																
	100	200	500	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750	4000	4250
100	26	53	132	264	330	396	462	528	594	660	726	792	858	924	990	1056	1122
200	53	106	264	528	660	792	924	1056	1188	1320	1452	1584	1716	1848	1980	2112	2244
400	106	211	528	1056	1320	1584	1848	2112	2376	2640	2904	3168	3431	3695	3959	4223	4487
600	158	317	792	1584	1980	2376	2772	3168	3563	3959	4355	4751	5147	5543	5939	6335	6731
800	211	422	1056	2112	2640	3168	3695	4223	4751	5279	5807	6335	6863	7391	7919	8447	8975
1000	264	528	1320	2640	3300	3959	4619	5279	5939	6599	7259	7919	8579	9239	9899	10558	11218
1200	317	634	1584	3168	3959	4751	5543	6335	7127	7919	8711	9503	10294	11086	11878	12670	13462
1400	370	739	1848	3695	4619	5543	6467	7391	8315	9239	10163	11086	12010	12934	13858	14782	15706
1600	422	845	2112	4223	5279	6335	7391	8447	9503	10558	11614	12670	13726	14782	15838	16894	17949
1800	475	950	2376	4751	5939	7127	8315	9503	10690	11878	13066	14254	15442	16630	17817	19005	20193
2000	528	1056	2640	5279	6599	7919	9239	10558	11878	13198	14518	15838	17157	18477	19797	21117	22437
2200	581	1161	2904	5807	7259	8711	10163	11614	13066	14518	15970	17421	18873	20325	21777	23229	24680
2400	634	1267	3168	6335	7919	9503	11086	12670	14254	15838	17421	19005	20589	22173	23757	25340	26924
2600	686	1373	3431	6863	8579	10294	12010	13726	15442	17157	18873	20589	22305	24020	25736	27452	29168
2800	739	1478	3695	7391	9239	11086	12934	14782	16630	18477	20325	22173	24020	25868	27716	29564	31411
3000	792	1584	3959	7919	9899	11878	13858	15838	17817	19797	21777	23757	25736	27716	29696	31675	33655

TABLE 12b ANNUAL KWH USAGE (ELECTRIC HEATING/COOLING) - TYPE II
Single Family, Single Story, Full Basement

BASELINE CITY, Hilo, Hawaii

Gross Square Feet	Heating or Cooling Degree Days																
	100	200	500	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750	4000	4250
100	20	41	102	204	255	306	357	408	459	511	562	613	664	715	766	817	868
200	41	82	204	408	511	613	715	817	919	1021	1123	1225	1327	1429	1532	1634	1736
400	82	163	408	817	1021	1225	1429	1634	1838	2042	2246	2450	2655	2859	3063	3267	3472
600	123	245	613	1225	1532	1838	2144	2450	2757	3063	3369	3676	3982	4288	4595	4901	5207
800	163	327	817	1634	2042	2450	2859	3267	3676	4084	4493	4901	5309	5718	6126	6535	6943
1000	204	408	1021	2042	2553	3063	3574	4084	4595	5105	5616	6126	6637	7147	7658	8168	8679
1200	245	490	1225	2450	3063	3676	4288	4901	5514	6126	6739	7351	7964	8577	9189	9802	10415
1400	286	572	1429	2859	3574	4288	5003	5718	6433	7147	7862	8577	9291	10006	10721	11436	12150
1600	327	653	1634	3267	4084	4901	5718	6535	7351	8168	8985	9802	10619	11436	12252	13069	13886
1800	368	735	1838	3676	4595	5514	6433	7351	8270	9189	10108	11027	11946	12865	13784	14703	15622
2000	408	817	2042	4084	5105	6126	7147	8168	9189	10210	11231	12252	13273	14295	15316	16337	17358
2200	449	899	2246	4493	5616	6739	7862	8985	10108	11231	12355	13478	14601	15724	16847	17970	19093
2400	490	980	2450	4901	6126	7351	8577	9802	11027	12252	13478	14703	15928	17153	18379	19604	20829
2600	531	1062	2655	5309	6637	7964	9291	10619	11946	13273	14601	15928	17256	18583	19910	21238	22565
2800	572	1144	2859	5718	7147	8577	10006	11436	12865	14295	15724	17153	18583	20012	21442	22871	24301
3000	613	1225	3063	6126	7658	9189	10721	12252	13784	15316	16847	18379	19910	21442	22973	24505	26036

TABLE 12c ANNUAL KWH USAGE (ELECTRIC HEATING/COOLING) - TYPE III
Single Family, Two Story, Partial (Less Than 50%) or No Basement

BASELINE CITY, Hilo, Hawaii

Gross Square Feet	Heating or Cooling Degree Days																
	100	200	500	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750	4000	4250
100	23	46	115	230	288	345	403	460	518	575	633	690	748	805	863	920	978
200	46	92	230	460	575	690	805	920	1035	1150	1265	1380	1495	1610	1725	1840	1955
400	92	184	460	920	1150	1380	1610	1840	2070	2300	2530	2760	2990	3220	3450	3680	3910
600	138	276	690	1380	1725	2070	2415	2760	3105	3450	3795	4140	4485	4830	5176	5521	5866
800	184	368	920	1840	2300	2760	3220	3680	4140	4600	5061	5521	5981	6441	6901	7361	7821
1000	230	460	1150	2300	2875	3450	4025	4600	5176	5751	6326	6901	7476	8051	8626	9201	9776
1200	276	552	1380	2760	3450	4140	4830	5521	6211	6901	7591	8281	8971	9661	10351	11041	11731
1400	322	644	1610	3220	4025	4830	5636	6441	7246	8051	8856	9661	10466	11271	12076	12881	13686
1600	368	736	1840	3680	4600	5521	6441	7361	8281	9201	10121	11041	11961	12881	13801	14721	15642
1800	414	828	2070	4140	5176	6211	7246	8281	9316	10351	11386	12421	13456	14491	15527	16562	17597
2000	460	920	2300	4600	5751	6901	8051	9201	10351	11501	12651	13801	14952	16102	17252	18402	19552
2200	506	1012	2530	5061	6326	7591	8856	10121	11386	12651	13916	15182	16447	17712	18977	20242	21507
2400	552	1104	2760	5521	6901	8281	9661	11041	12421	13801	15182	16562	17942	19322	20702	22082	23462
2600	598	1196	2990	5981	7476	8971	10466	11961	13456	14952	16447	17942	19437	20932	22427	23922	25418
2800	644	1288	3220	6441	8051	9661	11271	12881	14491	16102	17712	19322	20932	22542	24152	25763	27373
3000	690	1380	3450	6901	8626	10351	12076	13801	15527	17252	18977	20702	22427	24152	25878	27603	29328

TABLE 12d ANNUAL KWH USAGE (ELECTRIC HEATING/COOLING) - TYPE IV
Single Family, Two Story, Full Basement

BASELINE CITY, Hilo, Hawaii

Gross Square Feet	Heating or Cooling Degree Days																
	100	200	500	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750	4000	4250
100	25	51	126	253	316	379	442	505	568	632	695	758	821	884	947	1011	1074
200	51	101	253	505	632	758	884	1011	1137	1263	1390	1516	1642	1769	1895	2021	2148
400	101	202	505	1011	1263	1516	1769	2021	2274	2526	2779	3032	3284	3537	3790	4042	4295
600	152	303	758	1516	1895	2274	2653	3032	3411	3790	4169	4548	4927	5306	5685	6064	6443
800	202	404	1011	2021	2526	3032	3537	4042	4548	5053	5558	6064	6569	7074	7579	8085	8590
1000	253	505	1263	2526	3158	3790	4421	5053	5685	6316	6948	7579	8211	8843	9474	10106	10738
1200	303	606	1516	3032	3790	4548	5306	6064	6822	7579	8337	9095	9853	10611	11369	12127	12885
1400	354	707	1769	3537	4421	5306	6190	7074	7958	8843	9727	10611	11496	12380	13264	14148	15033
1600	404	808	2021	4042	5053	6064	7074	8085	9095	10106	11117	12127	13138	14148	15159	16170	17180
1800	455	910	2274	4548	5685	6822	7958	9095	10232	11369	12506	13643	14780	15917	17054	18191	19328
2000	505	1011	2526	5053	6316	7579	8843	10106	11369	12632	13896	15159	16422	17685	18949	20212	21475
2200	556	1112	2779	5558	6948	8337	9727	11117	12506	13896	15285	16675	18064	19454	20844	22233	23623
2400	606	1213	3032	6064	7579	9095	10611	12127	13643	15159	16675	18191	19707	21222	22738	24254	25770
2600	657	1314	3284	6569	8211	9853	11496	13138	14780	16422	18064	19707	21349	22991	24633	26275	27918
2800	707	1415	3537	7074	8843	10611	12380	14148	15917	17685	19454	21222	22991	24760	26528	28297	30065
3000	758	1516	3790	7579	9474	11369	13264	15159	17054	18949	20844	22738	24633	26528	28423	30318	32213

TABLE 12e ANNUAL KWH USAGE (ELECTRIC HEATING/COOLING) - TYPE V
Apartments

BASELINE CITY, Hilo, Hawaii

Gross Square Feet	Heating or Cooling Degree Days																
	100	200	500	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750	4000	4250
100	17	33	83	167	208	250	292	334	375	417	459	500	542	584	625	667	709
200	33	67	167	334	417	500	584	667	751	834	917	1001	1084	1168	1251	1334	1418
400	67	133	334	667	834	1001	1168	1334	1501	1668	1835	2001	2168	2335	2502	2669	2835
600	100	200	500	1001	1251	1501	1751	2001	2252	2502	2752	3002	3252	3503	3753	4003	4253
800	133	267	667	1334	1668	2001	2335	2669	3002	3336	3669	4003	4337	4670	5004	5337	5671
1000	167	334	834	1668	2085	2502	2919	3336	3753	4170	4587	5004	5421	5838	6255	6672	7089
1200	200	400	1001	2001	2502	3002	3503	4003	4503	5004	5504	6004	6505	7005	7505	8006	8506
1400	234	467	1168	2335	2919	3503	4086	4670	5254	5838	6421	7005	7589	8173	8756	9340	9924
1600	267	534	1334	2669	3336	4003	4670	5337	6004	6672	7339	8006	8673	9340	10007	10674	11342
1800	300	600	1501	3002	3753	4503	5254	6004	6755	7505	8256	9007	9757	10508	11258	12009	12759
2000	334	667	1668	3336	4170	5004	5838	6672	7505	8339	9173	10007	10841	11675	12509	13343	14177
2200	367	734	1835	3669	4587	5504	6421	7339	8256	9173	10091	11008	11925	12843	13760	14677	15595
2400	400	801	2001	4003	5004	6004	7005	8006	9007	10007	11008	12009	13010	14010	15011	16012	17012
2600	434	867	2168	4337	5421	6505	7589	8673	9757	10841	11925	13010	14094	15178	16262	17346	18430
2800	467	934	2335	4670	5838	7005	8173	9340	10508	11675	12843	14010	15178	16345	17513	18680	19848
3000	500	1001	2502	5004	6255	7505	8756	10007	11258	12509	13760	15011	16262	17513	18764	20015	21266

TABLE 13 MPS COOLING ZONE CONVERSION FACTORS

	Dwelling Prototypes					
	I	II	III	IV	V	VI
HUD MPS Heating Zone	Single Story No Basement	Single Story Full Basement	Double Story No Basement	Double Story Full Basement	Apart-ments	
1	2.12	1.96	2.06	2.08	1.87	

F. NON-SPACE HEATING/COOLING ENERGY CONSUMPTION/COST

The examples in the preceding sections (VI.C, VI.D and VI.E) dealt with the charges for space heating and cooling. However, to compute **total** energy consumption charges, the costs for energy consumed by lights, equipment, and appliances (Government **and** tenant owned) must be determined and added to the heating and cooling charges.

1. **Consumption**. Electric non-space heating/cooling consumption and cost estimates include electricity used by small appliances, lights, radios, television, refrigerators, ranges, washers, dryers, etc. These items, and their associated consumption levels, are shown in Table 14.

   To use Table 14, first, determine the finished floor space square footage range within which a specific quarters unit falls. Then, using the values in Table 14, add the kWh consumed by each appliance or equipment item which is present in the quarters unit. If a housing unit has more than one (1) refrigerator, freezer, room (window) air conditioner, or space heater, multiply the kWh shown in the table times the number of refrigerators, freezers, room air conditioners, or space heaters that are present in the quarters unit to determine the total monthly kWh consumption for these appliances.

   There may be instances where appliances are fueled by fossil fuels rather than by electricity. Table 14a provides monthly consumption (in MCF or gallons of fuel) for the most common of these.

   If an appliance listed in Table 14 or Table 14a is not present in the quarters unit at issue, do not include its monthly energy consumption when computing the total energy consumed by equipment and appliances.

2. **Cost**. The cost of electricity or fossil fuel consumed by appliances and equipment is easily computed by multiplying the total monthly consumption (as determined in the preceding paragraphs) times the appropriate charge per kWh, MCF or gallon. These unit charges are shown in Table 15.

TABLE 14 MONTHLY kWh USAGE: APPLIANCES AND EQUIPMENT

Appliance/ Equipment	Gross Square Feet of Living Space									
	Under 301	301-500	501-700	701-1,100	1,101-1,300	1,301-1,500	1,501-1,900	1,901-2,100	2,101-2,500	Over 2,500
Hot water heater	130	130	245	245	370	370	480	480	600	705
Stove / Microwave	45	45	50	50	55	55	60	60	65	70
Refrigerator 1/	45	50	50	50	85	85	85	85	85	85
Clothes washer	20	35	35	35	45	45	45	55	55	65
Clothes dryer	15	15	25	25	35	35	35	35	40	50
Dishwasher	35	35	45	45	60	60	70	70	80	95
Freezer 1/	70	70	70	70	70	70	70	70	70	70
Furnace fan	15	15	20	20	20	25	25	30	30	35
Room air conditioner	65	65	65	65	65	65	65	65	65	65
Television / radio	5	5	10	10	20	20	20	20	25	25
Lights	50	55	75	80	90	90	95	100	120	120
Space heater (portable) 1/	130	130	130	130	130	130	130	130	130	130
Misc. small appliances	30	30	45	45	65	65	75	80	95	105
Engine Heaters	195	195	195	195	195	195	195	195	195	195
Hot Tub	360	360	360	360	360	360	360	360	360	360

1/ If more than one of these appliances are present in a quarters unit, multiply the kWh consumption times the number of appliances to determine the total kWh consumed for each appliance category.

NOTE: FOR APPLIANCES OPERATED BY FOSSIL FUELS, SEE TABLE 14a.

TABLE 14a MONTHLY FOSSIL FUEL CONSUMPTION: APPLIANCES AND EQUIPMENT

Appliance/ Equipment	Gross Square Feet of Living Space									
	Under 301	301-500	501-700	701-1,100	1,101-1,300	1,301-1,500	1,501-1,900	1,901-2,100	2,101-2,500	Over 2,500
Hot water heater										
Natural Gas MCF	.55	.55	1.05	1.05	1.58	1.58	2.05	2.05	2.56	3.01
Propane Gallons	5.61	5.61	10.71	10.71	16.12	16.12	20.91	20.91	26.11	30.70
Fuel oil Gallons	3.87	3.87	7.39	7.39	11.12	11.12	14.43	14.43	18.02	21.19
Kitchen Range										
Natural Gas MCF	.19	.21	.21	.21	.36	36	.36	.36	.36	.36
Propane Gallons	1.94	1.94	2.14	2.14	2.35	2.35	2.65	2.65	2.86	3.06
Fuel oil Gallons	1.34	1.34	1.48	1.49	1.62	1.62	1.83	1.83	1.97	2.11
Refrigerator 1/										
Natural Gas MCF	.19	.21	.21	.21	.36	.36	.36	.36	.36	.36
Propane Gallons	1.94	2.14	2.14	2.14	3.67	3.67	3.67	3.67	3.67	3.67
Clothes dryer										
Natural Gas MCF	.06	.06	.11	.11	.15	.15	.15	.15	.17	.21
Propane Gallons	.61	.61	1.12	1.12	1.53	1.53	1.53	1.53	1.73	2.14
Freezer 1/										
Natural Gas MCF	.30	.30	.30	.30	.30	.30	.30	.30	.30	.30
Propane Gallons	3.06	3.06	3.06	3.06	3.06	3.06	3.06	3.06	3.06	3.06
Space heater (portable) 1/										
Natural Gas MCF	.55	.55	.55	.55	.55	.55	.55	.55	.55	.55
Propane Gallons	5.61	5.61	5.61	5.61	5.61	5.61	5.61	5.61	5.61	5.61
Fuel oil Gallons	3.87	3.87	3.87	3.87	3.87	3.87	3.87	3.87	3.87	3.87

1/ If more than one of these appliances are present in a quarters unit, multiply the consumption times the number of appliances to determine the total consumed for each appliance category.

NOTE: To compute the cost per month for an appliance that is fueled by a fossil fuel, multiply the consumption listed by the unit cost found in Table 15 of this report.

G. WATER AND SEWER CONSUMPTION/COST CALCULATIONS

In accordance with OMB Circular No. A-45 and Departmental policies and guidelines, when utilities are furnished by the Government, charges shall be based upon regional average residential rates and consumption levels applicable to private rental housing in the survey region.

Where regional survey procedures are used to establish base rental rates, *the charges for Government-furnished water and sewer services, must be based upon regional average water and sewer rates*, and *not* the rates prevailing in the nearest Established Community. In determining the regional average rates, the water and sewer rates for each survey community were obtained and averaged.

Thus, where the water service is unmetered, and where the Government furnishes water and sewer services, *including well water and septic waste disposal systems*, the regional average flat rate charges, shown below, shall be used. These charges are based upon (1) the average of the monthly service costs (including taxes, service charges, etc.) in all surveyed communities; and (2) consumption levels (based on numbers of bedrooms) contained in planning guides published by the Department of Housing and Urban Development (HUD). The rates below are based upon the number of bedrooms contained in a dwelling.

Flat Rate Water and Sewer Charges

Number of Bedrooms	Monthly Charges			Total
1 (or less)	$13.80 water	+	$25.50 sewer	= $39.30
2	$17.50 water	+	$26.00 sewer	= $43.50
3	$22.50 water	+	$27.00 sewer	= $49.50
4	$27.00 water	+	$28.00 sewer	= $55.00

H. GOVERNMENT PROVIDED METERED UTILITIES

Where the Government provides the utilities, and the consumption is metered *at the quarters unit level*, the following unit charges will apply.

TABLE 15 UTILITY CHARGES (COST PER UNIT)

Do not calculate the total cost of electricity in steps, such as the first 500 kWh costs so much, then the second 500 kWh costs so much, etc.

a. Electricity

kWh Consumed Per Month	Charge Per kWh
0 - 500	$.194
501 - 1,000	$.187
1,001 - 1,500	$.195
Over - 1,500	$.183

b. Fuel Oil #2 — $ 1.17 Per Gallon.

c. Propane — $2.54 Per Gallon.

d. Natural Gas — $27.27 Per MCF (1,000 cubic feet).

e. Water

Water Consumed Per Month	Cost Per Gallon
1 – 3,000 Gallons	$0.0046
3,001 - 5,000 Gallons	$0.0035
5,001 - 7,500 Gallons	$0.0030
Over - 7,500 Gallons	$0.0027

f. Sewer

Sewer Consumed Per Month	Cost Per Gallon
1 - 3,000 Gallons	$0.0085
3,001 - 5,000 Gallons	$0.0052
5,001 - 7,500 Gallons	$0.0036
Over - 7,500 Gallons	$0.0028

I. GARBAGE/TRASH REMOVAL SERVICE RATES

In the case of garbage and trash hauling, as with other Government-provided services, OMB Circular No. A-45 requires the charges to be based upon the domestic rates for comparable services provided to occupants of private rental units in the survey area.

The garbage and trash services provided to quarters occupants vary from weekly to daily service. Establishment of a service charge based upon the service in the nearest established community may or may not reflect a similar level of service. Therefore, the charge for garbage and trash collection, when conducted by the Government, will, regardless of quarters type, be **$9.65 per quarters unit per month**.

J. CHARGES FOR APPLIANCES AND RELATED SERVICES

OMB Circular No. A-45 requires agencies to charge occupants of Government quarters for appliances, furnishings and services which the Government provides with the quarters. The charges for appliances, furnishings and services most typically provided by Federal agencies are found in Table 16. The monthly recapture cost of the items in Table 16 were determined from information gathered by contractors in the survey communities of all QMIS regions, and from special studies conducted by the QMIS Program Office.

Agencies providing appliances, furnishings or services that are not included in Table 16 are responsible for establishing an appropriate monthly charge which reflects the private market value of the item(s) provided. In such cases, the agency or bureau should advise the QMIS Program Office to ensure that subsequent regional survey reports include charges for all Government-provided appliances, furnishings and services.

TABLE 16 MONTHLY CHARGES FOR APPLIANCES & RELATED SERVICES

APPLIANCES		SERVICES AND FURNISHINGS	
Range (Gas / Electric) *	(+/-)$3.60	Storage Shed (Per Unit)	$2.55
Refrigerator *	(+/-)$3.30	Furniture (Per Room)	11.50
Clothes Washer	3.80	Swimming Pool	
Clothes Dryer	3.20	Private Pool	60.00
Dishwasher	3.15	Community Pool	20.00
Microwave Oven	1.40	Satellite Dish	17.70
Trash Compactor	3.60	Cable Television	22.90
Freezer	1.90	Premium Channel (Each)	15.40
Freezer (Community)	1.00	Maid Service	67.75
Window Air Conditioner		Lawncare (Per Mowing)	
Refrigerated Unit	4.10	Houses (Excluding Plexes)	20.80
Evaporative (Swamp) Unit	3.05	All Other Classes	10.40
Free Standing Stove	3.65	Snow Removal (Per Removal)	12.30
Fireplace Insert	4.40	Firewood (Per Cord)	126.75
Lawn Mower	3.80		
Hot Tub	33.30	ELECTRIC CREDITS	
		Well pump (0-1 Bedroom)	1.15
Community Laundry		Well pump (2 Bedrooms)	1.80
(Non-Coin Operated)		Well pump (3 Bedrooms)	2.60
Washer Only	1.90	Well pump (4+ Bedrooms)	3.50
Dryer Only	1.60		
Washer and Dryer	3.50	Sewer Lift Pump (0-1	1.15
		Sewer Lift Pump (2	1.15
		Sewer Lift Pump (3	1.35
		Sewer Lift Pump (4+	1.80
ISOLATION ADJUSTMENT	2.80	Base Radio	1.15
		Remote Control Relay	1.15
		Sump Pump	1.15
		Radon Mitigation Fan	10.35

** If the Government provides one range and refrigerator, no additions or deductions are made.*

If the Government does not provide a range or a refrigerator, deduct the amount shown above.

If the Government provides 2 or more ranges or refrigerators, add the amounts shown above for each appliance furnished in excess of one range and one refrigerator.

VII. ADMINISTRATIVE ADJUSTMENTS

Once the MBRR is established, certain adjustments (e.g. for isolation and amenity deficiencies) are authorized by OMB Circular No. A-45. These administrative adjustments are established by OMB and are not derived from regional surveys conducted by the QMIS Program Office.

The administrative adjustments contained in OMB Circular A-45, and described below, are not authorized for dormitories, bunkhouses, or transient quarters. This is because the rental rates for those housing classes are administratively established, through extensions of the principle of comparability, and are not based directly upon market comparability.

A. SITE AMENITY ADJUSTMENTS

Living conditions at some Government housing sites are not always the same as those found in the survey communities. In the communities surveyed, the amenities discussed below (and in OMB Circular A-45) are generally present and their contributory value is included in the contract rent and in the quarters MBRR's determined from the tables in this report. Thus, if any amenity listed below is present at the quarters site, no positive adjustment is made for that amenity because its presence has already accounted for in the MBRR. However, the lack of an amenity discussed below represents a less desirable condition that should be reflected as a **negative** percentage adjustment to the quarters MBRR or CPI-adjusted MBRR (CPI-MBRR), whichever is applicable.

1. **Reliability and adequacy of water supply**. The water delivery system at the quarters site should provide potable water (free of significant discoloration or odor) at adequate pressure at usual outlets. If the water delivery system at the quarters site does not meet these conditions, 3 percent should be deducted from the MBRR or CPI-MBRR, whichever is applicable.

2. **Reliability and adequacy of electric service**. Electric service at the quarters site must equal or exceed a 100-ampere power system, and should provide 24-hour service under **normal** conditions. When evaluating the electric service, housing managers are reminded that OMB Circular A-45 recognizes that occasional temporary power outages are considered to be "**normal**" conditions. Furthermore, if an adequate back-up generator is available, then the electric service amenity will be considered to be reliable and adequate regardless of the reliability of the primary power source. When electric service is inadequate and unreliable, 3 percent should be deducted from the MBRR or CPI-MBRR whichever is applicable.

3. **Reliability and adequacy of fuel for heating, cooling and cooking.** There should be sufficient fuel storage capacity to meet prevailing weather conditions and needs. Where electricity is used as the heating, cooling or cooking "fuel," an adjustment can only be made when a deduction has been made for deficient electric service (see paragraph VII.A.2, above). If the fuel delivery/storage system is inadequate, 3 percent should be deducted from the MBRR or the CPI-MBRR, whichever is applicable.

4. **Reliability and adequacy of police protection**. Law enforcement personnel, including Government employees with law enforcement authority, should be available on a 24-hour basis. OMB Circular A-45 defines "**availability**" as the ability of law enforcement officers to respond to

emergencies at the quarters site as quickly as a law enforcement officer in the nearest established community could respond to an emergency in the nearest established community.

OMB Circular A-45 further provides that where part-time officers serve the quarters site, the fact that the officers are part-time does not necessarily mean that they are less available than officers in the nearest established community. The important point is that the availability determination must be based on comparative response times (quarters site vs. the nearest established community) - not the employment conditions of the officers serving the quarters site.

Finally, OMB Circular A-45 provides that gaps in availability due to temporary illness or injury, use of annual leave, temporary duties, training, or other short absences, do not render law enforcement personnel "unavailable" at the quarters site.

If, after applying these guidelines, it is determined that the law enforcement protection at the quarters site is unreliable and inadequate in comparison to the reliability and adequacy of law enforcement protection in the nearest established community, 3 percent should be deducted from the MBRR or CPI-MBRR, whichever is applicable.

5. **Fire insurance availability or reliability and adequacy of fire protection**. Fire insurance should be available (for the quarters) with the premium charge based upon a rating equal to the rating available to comparable housing located in the nearest established community. Alternatively, adequate equipment, an adequate supply of water (or fire retardant chemical), and trained personnel should be available on a 24-hour basis to meet foreseeable emergencies. OMB Circular A-45 provides that **if either element is present (adequate insurance or an adequate fire fighting capability), no adjustment is authorized**. If both elements are missing, 3 percent should be deducted from the MBRR or CPI-MBRR, whichever is applicable.

6. **Reliability and adequacy of sanitation service**. An adequately functioning sewage disposal system and a solid waste disposal system should be available. OMB Circular A-45 considers septic, cesspool or other systems adequate even though they may require periodic maintenance, as long as they are usable during periods of occupancy. If the sanitation service at the quarters site is unreliable or inadequate, 3 percent should be deducted from the MBRR or CPI-MBRR, whichever is applicable.

7. **Reliability and adequacy of telephone service**. Access to commercial telephone facilities should be available on a 24-hour basis. Deductions (except as provided below) are not allowed for occasional temporary interruptions of telephone service. OMB Circular A-45 allows specific deductions for various levels of service and privacy. These are explained below.

   a. The MBRR or CPI-MBRR (whichever is applicable) should be reduced by 3 percent if telephone service is not available within the quarters or within 100 yards of the quarters.

   b. The MBRR or CPI-MBRR (whichever is applicable) should be reduced by 2 percent if there is no telephone service within the quarters, but telephone service (either private or party line) is available within 100 yards of the quarters.

c. The MBRR or CPI-MBRR (whichever is applicable) should be reduced by 1 percent if telephone service is available in the employee's quarters, but the service is not private line service and/or the service is not accessible on a 24-hour per day basis.

8. **Noise and odors**. If there are frequent disturbing or offensive noises and/or odors at the quarters site, 3 percent should be deducted from the MBRR or CPI-MBRR, whichever is applicable.

9. **Miscellaneous improvements**. One or more of the following improvements should be available at the quarters site: paved roads/streets, sidewalks or street lights. If any one of these improvements is present, no deduction is authorized. If all three of these improvements are missing (i.e., there are no paved roads/streets **and** there are no sidewalks, **and** there are no street lights), 1 percent should be deducted from the MBRR or CPI-MBRR, whichever is applicable.

B. ISOLATION ADJUSTMENT

In some cases, Government quarters are located far from the nearest established community (see paragraph IX.C for the OMB's definition of "established community"). In addition, different modes of transportation (travel categories) may serve to further isolate the quarters from the nearest established community. In situations where the quarters location and the travel categories meet the requirements contained in OMB Circular A-45, an isolation adjustment should be applied. To determine whether an isolation adjustment applies, and the amount of the adjustment (if one does apply), you should follow the steps in the Isolation Adjustment Computation Schedule, shown on the following page. This schedule is a (modified) reproduction of the appendix to OMB Circular A-45, and is included in this report for illustrative purposes, only. Therefore, you should use the form prescribed by your agency or bureau when documenting the isolation adjustment.

Isolation Adjustment Computation

- *Step 1.* Determine the one-way distance in miles (from the quarters to the nearest established community) for each category of transportation listed in Figure 1. Enter mileage(s) in the appropriated block(s) under Column B.

- *Step 2.* Multiply mileage figures entered in Column B by point values listed in Column A for each affected category of transportation to produce one-way points for each category. Add 29 points to the category 4 subtotal and 27 points to the category 5 subtotal to reflect relative differences in cost or time by use of these modes of travel.

- *Step 3.* Add all categories of one-way points in Column C to produce one-way points. (The total must exceed 30 points or there is no adjustment for isolation.)

Figure 1

Category of Travel	Column A Point Value		Column B One-way Miles		Column C One-way Points
(1) Paved road or rail	1.0	X	=		
(2) Unpaved but improved road	1.5	X	=		
(3) Unimproved road	2.0	X	=		
(4) Water, snowmobile, pack animal, foot or other special purpose conveyance	2.5	X	=	___+29	
(5) Air	4.0	X	=	___+27	
			=		
TOTAL ONE-WAY POINTS					

- *Step 4.* Calculate the Isolation Adjustment Factor (IAF) using the following OMB formula: Multiply 2 (to reflect round-trip points) by 4 (to reflect number of trips per month) and then multiply by $x.xx (GSA's current automobile allowance as of the last day of September of each year). For example, the GSA mileage allowance, as of September 30, 2001, was $0.345 per mile, resulting in a IAF of 2.80.

ISOLATION ADJUSTMENT FACTOR = 2.80

- *Step 5.* Multiply total adjusted points by the Isolation Adjustment Factor to produce the monthly adjustment for isolation (rounded to the nearest whole dollar).

MONTHLY ADJUSTMENT =

C. LOSS OF PRIVACY

Some quarters occupants are subject to a loss of privacy during non-duty hours by virtue of **public visits which occur several times daily**. In other cases, quarters occupants may be **inhibited from enjoying the full range of activities normally associated with living in private rental housing** (such as where restrictions are imposed on activities in quarters at national cemeteries, or where quarters are in view of prison inmates). In such cases, OMB Circular A-45 allows a deduction from the MBRR or CPI-MBRR (whichever is applicable) of up to 10 percent. OMB Circular A-45 instructs housing managers to establish proportional adjustments to reflect situations of less frequency or seriousness in their impact upon privacy or usage, or to reflect seasonal variations.

D. EXCESSIVE OR INADEQUATE SIZE

Quarters occupants are sometimes provided dwellings that are excessively large or small for their needs. This may be because the range and variety of quarters available at an installation may be much less than that which is available in private rental markets. In such cases, OMB Circular A-45 allows a deduction from the MBRR or the CPI-MBRR (whichever is applicable) of up to 10 percent. The Circular instructs that the deduction should be in direct proportion to the degree of excess or inadequacy, and that the deduction must not continue beyond one month after suitable quarters are made available. Before this adjustment is applied, local housing managers should consult with managers within their agencies or bureaus to determine whether other alternatives (such as closing off rooms and other excess space) would offer a more suitable means of adjustment.

E. LIMITATIONS TO ADMINISTRATIVE ADJUSTMENTS

Administrative adjustments cannot be applied without limit. OMB Circular A-45 provides that the MBRR or CPI-MBRR cannot be reduced by more than 50 percent unless an isolation is authorized and applied. For quarters which receive an isolation adjustment, the MBRR or CPI-MBRR may not be reduced by more than 60 percent. These limitations do not apply to excessive heating or cooling adjustments, which are described in paragraph IX.A of this report.

VIII. CONSUMER PRICE INDEX ADJUSTMENTS

OMB Circular A-45 requires annual verification, and adjustment (when necessary) of the following rental components that are presented in this report: (1) the Monthly Base Rental Rates (MBRR's); (2) the charges for related facilities (utilities, appliances, furnishings and services); and (3) the Isolation Adjustment Factor (IAF). These verifications and adjustments are to be made, essentially, in each interim year between baseline regional surveys.

Generally, OMB Circular A-45 specifies that these changes are to be based upon September index levels of specified components of the Consumer Price Index (CPI); and the GSA temporary duty mileage allowance in effect as of September 30, of each year. These changes must be implemented at the beginning of the first pay period in March of each following year.

The QMIS Program Office is responsible for determining the amounts of these changes, and for providing QMIS Program participants with the information, the software and the instructions needed to implement the required changes. This information is usually distributed to each National Quarters Officer in November of each year. National, regional or installation quarters managers (as required by your agency or bureau) are responsible for implementing these annual rental adjustments.

IX. OTHER OMB CIRCULAR A-45 RENT CONSIDERATIONS

A. EXCESSIVE HEATING OR COOLING COSTS

OMB Circular A-45 authorizes a deduction from the Monthly Base Rental Rate (MBRR) or the Consumer Price Index - adjusted Monthly Base Rental Rate (CPI-MBRR), whichever is applicable, when quarters are unusually costly to heat or cool. This adjustment is allowed only when (1) the excessive heating or cooling costs are due to the poor design of the quarters or the lack of adequate insulation/weather-proofing; and (2) when the energy/fuel used for heating and/or cooling is metered. This adjustment will vary from quarters-to-quarters, but is the difference between the actual heating and/or cooling costs paid by the quarters occupant and 125 percent of the cost of heating and/or cooling a comparable (but adequately constructed and insulated) dwelling located in the same climate zone. For more information on this adjustment, you should consult your agency or bureau policies.

B. INCREMENTAL ADJUSTMENTS

New baseline regional surveys or annual CPI adjustments may occasionally increase quarters rents by more than 25 percent. When this occurs, OMB Circular A-45 allows housing managers to impose the increase incrementally over a period of not more than one year. The Circular also requires that such increases must be applied in equal increments on at least a quarterly basis.

C. ESTABLISHED COMMUNITY

OMB Circular A-45 has established the following minimum standards for use in determining which population centers (cities, towns, etc.) may be used as "established communities" when determining quarters rents.

1. An established community must have a year-round population of 1,500 or more (5,000 or more in Alaska). The population determinations must be based upon the most recently conducted decennial census.

2. An established community must have at least one doctor and one dentist, who are available to all quarters occupants on a non-emergency basis.

3. An established community must have a private rental market with housing available to the general public. This requirement excludes communities on military posts, Indian reservations and other Government installations which may meet the other criteria contained in paragraphs IX.C.1 and 2, above.